PB-230 537

POLLUTION OF LAKE ERIE AND ITS TRIBUTARIES, NEW YORK. PROCEEDINGS OF CONFERENCE, THIRD SESSION, HELD AT BUFFALO, NEW YORK ON MARCH 22, 1967. VOLUME I

Federal Water Pollution Control
Administration
Washington, D. C.

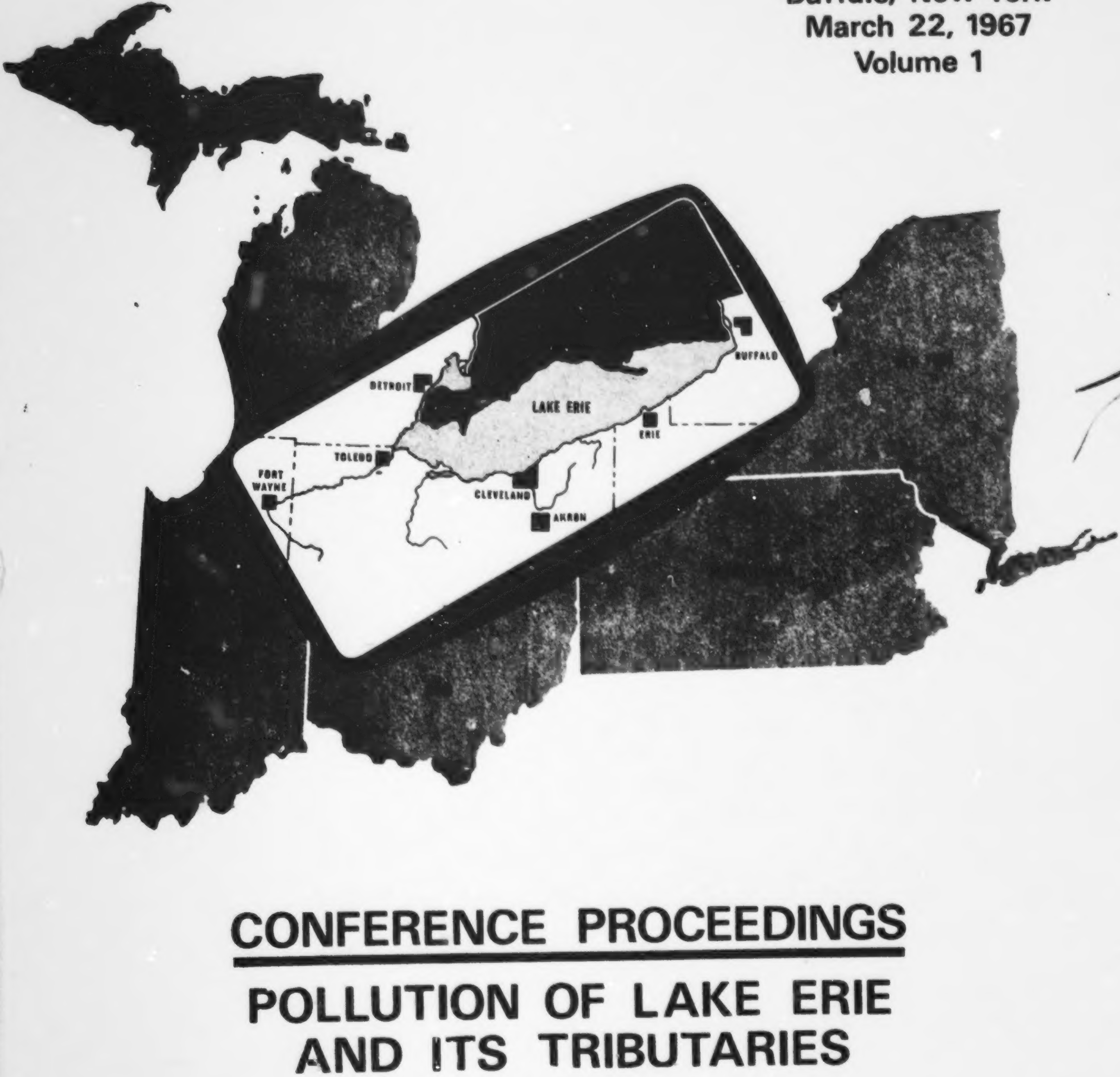
1967

DISTRIBUTED BY:

NTIS
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 230 537

Third Session
Buffalo, New York
March 22, 1967
Volume 1


BUFFALO
DETROIT
LAKE ERIE
ERIE
TOLEDO
FORT WAYNE
CLEVELAND
AKRON

CONFERENCE PROCEEDINGS

POLLUTION OF LAKE ERIE AND ITS TRIBUTARIES

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

Federal Water Pollution Control Administration U. S. Department of the Interior

CLEAN WATER

CONTENTS

PAGE

Opening Statement
by Murray Stein 4

Hon. R. D. McCarthy (by Mrs. R. D. Fierstein) 12

M. E. Welsh 16

H. W. Poston 27

G. W. Cook 33

Col. R. W. Neff 54

G. L. Harlow 60

W. A. Lyon 124

P. Miller 152

R. Purdy 181

G. H. Eagle 208

D. Metzler 281

R. D. Hennigan 287

J. McMahon 466

C. B. Proudfoot 474

Reproduced from best available copy.

The report is on the Third Session of the Conference on ~~in the Matter~~ of Pollution of the Interstate and Ohio Intrastate Waters of Lake Erie and its Tributaries (Indiana-Michigan-New York-Ohio-Pennsylvania), ~~held at the~~ for Statler-Hilton Hotel, Buffalo, New York, on March 22, 1967~~, at 9:30 a.m.~~

It includes statements, discussions, and recommendations on: Nutrients which enter the lake; map of Lake Erie Basin; water quality criteria; and related information.

PRESIDING:

Mr. Murray Stein, Assistant Commissioner for Enforcement, Federal Water Pollution Control Administration, Department of the Interior.

CONFEREES:

Robert D. Hennigan, Assistant Commissioner, New York State Department of Health, Division of Pure Waters

Dwight Metzler, Deputy Commissioner, New York State Department of Health, Division of Pure Waters

George H. Eagle, Chief Engineer, Ohio Department of Health, Columbus, Ohio

CONFEREES (Continued):

Loring F. Oeming, Executive Secretary, Michigan Water Resources Commission

Blucher A. Poole, Technical Secretary, Indiana Stream Pollution Control Board, Indianapolis, Indiana

Walter A. Lyon, Director, Division of Sanitary Engineering, Pennsylvania Department of Health

H. W. Poston, Regional Director, Great Lakes Region, Federal Water Pollution Control Administration, Department of the Interior, Chicago, Illinois

PARTICIPRNTS:

Hon. Richard D. McCarthy, Member of Congress from the 39th Congressional District of the State of New York (statement read by Mrs. Robert Fierstein)

Grover W. Cook, Chief of Enforcement, Great Lakes Region, Federal Water Pollution Control Administration, Department of the Interior, Chicago, Illinois

Colonel R. Wilson Neff, District Engineer, Corps of Engineers, Department of the Army

George L. Harlow, Director, Lake Erie Program Office, Federal Water Pollution Control Administration, Department of the Interior, Cleveland, Ohio

PARTICIPANTS (Continued):

Perry Miller, Assistant Director, Division of Sanitary Engineering, Indiana State Board of Health, Indianapolis, Indiana

Ralph Purdy, Chief Engineer, Michigan Water Resources Commission, Lansing, Michigan

John McMahon, Regional Engineer, Division of Water Resources, New York State Department of Conservation

Charles B. Proudfoot, Niagara Falls, New York

Larry Miller, Regional Sanitary Engineer, Pennsylvania Department of Health, Meadville, Pennsylvania

LIST OF ATTENDANCE:

Robert Altwies, Executive Secretary, Chautaqua Econ. Dev., Chautaqua County, Mayville, New York, Box 156

Mrs. Robert T. Basnett, League of Women Voters, 130 Catherine, Williamsville, New York 14221

L. F. Birkel, Staff Engineer, Republic Steel, Cleveland, Ohio

R. W. Brown, Dir. Cent. Research, Hammermill Paper Company, Erie, Pennsylvania

Charles G. Bueltman, Technical Director, Soap and Detergent Association, 485 Madison Avenue, New York, New York

Linda Carter, Sr. San. Chemist, New York State Department of Health, Buffalo, New York

D. S. Caverly, General Mgr., Ontario Water Resources Commission, 201 Bian Street, Toronto, Canada

C. R. Chinnock, Chief Plant Engineer, Hanna Furnace Corporation, P. O. Box 4120, Buffalo

Ralph G. Christensen, Supv. Microbiologist, Acting Deputy Director, Detroit River Lak, Erie Project, Grosse Pointe, Michigan

Grover W. Cock, Chief Enforcement, G L Region, FWPCA, 33 E. Congress, Chicago, Illinois

LIST OF ATTENDANCE (CONTINUED):

Robert V. Day, Senior Engineer, Western Electric Company, Inc., 222 Broadway, New York, New York 10038

William R. Diem, Reporter, Cleveland Plain Dealer, 1801 Superior Avenue, Cleveland, Ohio

A. W. Dold, Mgr. Business Service, Buffalo Area, Chamber of Commerce, 238 Main Street, Buffalo, New York 14202

Thomas M. Donochue, McGraw Hills' Air and Water News, 330 West 42nd Street, New York, New York

George H. Eagle, Chief Engineer, Ohio Department of Health, 450 E. Town Street, Columbus, Ohio

Kenvin H. Ferber, Tech. Manager, Allied Chemical Corporation, Buffalo Avenue Plant, Box 1069, Buffalo, New York 14240

Theodore J. Finnegan, Attorney, Niagara Mohawk Power Company, 1200 Electric Building, Buffalo, New York 14203

Edward J. Fox, Pollution Chairman, Locksley Taxpayers Association, 28 Oxforoter, Hamburg, New York

W. L. Gadd, Chemist, National Steel Corporation, Weirton, West Virginia 26062

Paul Cygan, Chief Bureau of Sewers, Erie, Pennsylvania

LIST OF ATTENDANCE (CONTINUED):

Edwin E. Geldreich, Research Microbiologist, FWPCA, Cincinnati Water Research Laboratory, 4676 Columbia Parkway, Cincinnati, Ohio 45226

James A. Gonck, Supervisor, Effluent Control, Ind. Chemical Division, Allied Chemical Corporation, Box 1069, Buffalo, New York 14240

Louis J. Gugliuzza, Sr. San. Chemist, Buffalo Sewer Association, Ft. West Ferry Street, Buffalo, New York 14213

George L. Harlow, Director, Lake Erie Prog. Off., FWPCA, 21929 Lorain Avenue, Cleveland, Ohio 44126

Robert P. Hartley, Chief Surveillance Section, FWPCA, 21929 Lorain Avenue, Cleveland, Ohio 44126

Robert D. Hennigan, Assistant Commissioner, Division of Pure Waters, New York State Department of Health, 84 Hallmark Avenue, Albany, New York

R. L. Hickey, New York State Department of Commerce, Buffalo, New York

Mrs. S. D. Higgins, Lake Erie Basin Committee, League of Women Voters, Scherer & Ward Roads, Orchard Park, New York 14127

L. C. Jugle, Pollution Control Supervisor, Union Carbide Chemicals and Plastics, 137-47th Street, Niagara Falls, New York

LIST OF ATTENDANCE (CONTINUED):

W. H. Jukkola, Technical Coordinator Ind. Wastes Control, Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh, Pennsylvania

Richard Kressin, Chief Chemist, Buffalo Sewer Authority, Buffalo, New York 14213

L. R. Kumnick, Loss and Waste Control Engineer, Sun Oil Company, P. O. Box 920, Toledo, Ohio 43601

James L. Kerwin, Reporter, Detroit News, 615 North Lafayette, Detroit, Michigan

W. C. Lang, Manager, Chemical Engineer, General Tire and Rubber Company, Akron, Ohio

Arthur C. Lyman, Engineer, Western Electric Company, P. O. Station B, Buffalo, New York

John H. Bunz, Secretary, Erie County Federal of Sportsmans Club, 1190 Parkhurst Boulevard, Tonawanda, New York

Kenneth M. Mackenthun, Aquatic Biologist, United States Department of the Interior, Cincinnati, Ohio

Kevin D. Mahar, Sales Manager, Donner Hanna Coke Corporation, Buffalo, New York

Mr. H. Mandell, Senior Engineer, D. T. W., City of Buffalo, Buffalo, New York

LIST OF ATTENDANCE (CONTINUED):

Edward J. Martin, Acting Chief, Pollution Control Anol. Bd., FWPCA, Washington, D. C.

Mr. John McMahon, Regional Engineer, New York State Conservation Department, West Seneca, New York

Dwight F. Metzler, Deputy Commissioner, New York State Health Department, Albany, New York

Mrs. Charles A. Michael, League of Women Voters, Williamsville, New York

Mrs. G. D. Moore, League of Women Voters, Williamsville, New York

Mrs. H. T. Moore, League of Women Voters, Chardon, Ohio

Mr. Larry Miller, Regional Sanitary Engineer, Pennsylvania Department of Health, Meadville, Pennsylvania

Mr. Perry Miller, Assistant Director, Division of Sanitary Engineering, Indiana State Board of Health, Indianapolis, Indiana

Carl C. Mirus, Project Manager, Pollution Abatement, Allied Chemical Corporation, Buffalo, New York

Lawrence R. Moriarty, Deputy Director, LOPO, FWPCA, Rochester, New York

Loring F. Oeming, Executive Secretary, Michigan Water Resources Commission, Lansing, Michigan

Reproduced from best available copy.

LIST OF ATTENDANCE (CONTINUED):

Dr. Paul Olynyk, Associate Professor, Cleveland State University, Cleveland, Ohio

Beucher A. Poole, Technical Secretary, Indiana Stream Pollution Control Board, Indianapolis, Indiana

Chris Potos, Chief Chemist, Buffalo, New York

Charles B. Proudfoot, Niagara Falls, New York

Mr. Ralph Purdy, Chief Engineer, Michigan Water Resources Commission, Lansing, Michigan

Mrs. David F. Rieman, Jr., League of Women Voters, Hamburg, New York

Mr. Robert W. Ruch, Mechanical Engineering, N.A.S.A. Plum Brook Station, Sandusky, Ohio

Mr. Melvin Ruszaj, Chemist, FWPCA, I.J.C. Field Unit, Buffalo, New York

Eugene F. Seebold, Regional Director, Public Health Engineering, New York State Department of Health, Buffalo, New York

Mrs. Richard Smith, League of Women Voters, Cleveland, Ohio

Mrs. Charles Stebbins, League of Women Voters, Rocky River, Ohio

W. E. Stahlka, System Hydraulic Engineer, Niagara Mohawk, Buffalo, New York

LIST OF ATTENDANCE (CONTINUED):

Michael J. Stankewich, Director, Environmental Health, Erie County Health Department, Buffalo, New York

Edward F. Stevenson, Facility Engineer, NASA, Cleveland, Ohio

Donald B. Stevens, Chief, Research and Development, New York State Department of Health, Albany, New York

Gerald Strobel, Assistant Sanitary Engineer, NYSCD DWR, West Seneca, New York

Paul N Sutton, Dow Chemical Company, Midland, Michigan

John S. Tygert, Project Engineer, New York State Department of Health, Buffalo, New York

John J. Toth, Erie County Department of Health, Erie, Pennsylvania

Louis M. Violanti, New York State Health Department, Buffalo, New York

Fred A. Voege, Assistant General Manager, Ontario Water Resources Commission, Toronto, Ontario

Anthony T. Voell, New York State Department of Health, Buffalo, New York

George H. Watkins, Executive Director, Lake Erie Watershed Conservation Foundation, Cleveland, Ohio

A. W. West, FWPCA, Cincinnati, Ohio

LIST OF ATTENDANCE (CONTINUED):

Mrs. R. J. Winzler, League of Women Voters, Snyder, New York

Alois Zasada, Superintendent, City of Erie, Erie, Pennsylvania

Everett F. Zurn, Water Pollution Control Advisory Board, Wash., Erie, Pennsylvania

William J. Riley, FWPCA, Chicago, Illinois

Adel Wagner (Miss) FWPCA, Lake Erie Program Office, Cleveland, Ohio

Miss Carolyn Gazdik, FWPCA, Lake Erie Program Office, Cleveland, Ohio

L. E. Townsend, Director, Lake Erie Program Office, FWPCA, Rochester, New York

George G. McKnight, Office of Planning Coordination, Western New York Office, Buffalo, New York

Herbert Anderson, Director, Buffalo Field Unit, FWPCA, Buffalo, New York

Frank Hall, Assistant Chief, Enforcement, FWPCA, GLR, Chicago, Illinois

Rheta Piere, FWPCA, Washington, D. C.

Glenn D. Pratt, FWPCA, Lake Erie Program Office, Fairview Park, Ohio

PROCEEDINGS

OPENING STATEMENT
BY
MR. MURRAY STEIN

MR. STEIN: The conference is open.

This conference in the matter of pollution of Lake Erie and its tributaries in the States of Michigan, Indiana, Ohio, Pennsylvania, and New York is being held under the provisions of Section 10 of the Federal Water Pollution Control Act, as amended. The Secretary of the Interior is authorized to call a conference of this type when requested to do so by the Governor of a State, and when on the basis of reports, surveys or studies he has reason to believe that pollution subject to abatement under the Act is occurring.

In a letter dated June 11, 1965, Governor James A. Rhodes of Ohio requested that a conference be called to consider pollution of Lake Erie. In accordance with this request. as well as on the basis of reports, surveys, or studies, a Federal-State enforcement conference was held on August 3-5, 1965, at Cleveland, Ohio, and on August 10-12, at Buffalo, New York. In addition, a third meeting of the conferees was held on June 22, 1966.

As you can appreciate, we are covering a wide area involving five States. This is one of the largest Federal conferences we have had in the number of States involved, or probably the second largest, the only larger one being the whole Colorado River of 1,400 miles of mainstem and 60 tributaries. Next to that, this is the largest. We hold conferences in each of the States in turn and are in Buffalo for this session.

As specified in Section 10 of the Federal Water Pollution Control Act, the official water pollution control agencies of Michigan, Indiana, Ohio, Pennsylvania and New York have been notified of this conference. The State of Indiana has designated as its conferee Mr. Blucher Poole; the conferee for the State of Michigan is Mr. Loring Oeming; Ohio will be represented by Mr. George Eagle; Pennsylvania will be represented by Mr. Walter Lyon; and New York will be represented by Mr. Dwight Metzler and Mr. Robert Hennigan.

The Federal conferee is Mr. H. W. Poston, who is Director for this region of the Federal Water Pollution Control Administration of the Department of the Interior, with headquarters in Chicago, Illinois.

My name is Murray Stein, and I am from headquarters of the Federal Water Pollution Control Administration in

Washington, D. C., and the representative of Secretary Udall.

The parties to this conference are the Indiana Stream Pollution Board, the Michigan Water Resources Commission, the Ohio Water Pollution Control Board, the Pennsylvania Department of Health, the New York State Department of Health, and the U. S. Department of the Interior. Participation in this conference will be open to representatives and invitees of these agencies and such persons as inform me that they wish to present statements. However, only the representatives of the official State water pollution control agencies and the U. S. Department of the Interior constitute the conferees.

The first two sessions of the conference concerning pollution of Lake Erie were held August 3-5, 1965, and August 10-12, 1965. At the August 10-12 session the conferees unanimously concluded that "Lake Erie and many of its tributaries are polluted. The main body of the Lake has deteriorated in quality at a rate many times greater than its normal aging processes, due to inputs of wastes resulting from the activities of man. The identified pollutants contributing to the damage to water uses in Lake Erie are sewage and industrial wastes, oils, silts, sediment, floating solids, and nutrients (phosphates and nitrates). Enrichment of Lake Erie, caused by man-made contributions of nutrient materials is proceeding at a rather rapid rate. Pollution in Lake Erie and many of its tributaries causes significant damage to recreation, commercial fishing, sport fishing, navigation, water supply and aesthetic values." Further, the conferees agreed that many sources of waste discharge reaching Lake Erie have inadequate treatment facilities.

To abate this pollution of Lake Erie, the conferees representing the five States affecting the Lake unanimously agreed to a program of remedial action. Included in this action program is the recommendation that "municipal wastes are to be given secondary treatment or treatment of such nature as to effectuate the maximum reduction of biochemical oxygen demand and phosphates as well as other deleterious substances." And disinfection of municipal waste effluents is to be practiced so that coliform densities are reduced to recommended levels.

For industrial wastes, the conferees recommended that practices for the segregation and treatment of waste are to be improved to effect the maximum reductions of a variety of industrial waste substances. Just to show you the complex nature of the problem, I think I will go through the list:

1. Acids and alkalies
2. Oil and tarry substances
3. Phenolic compounds and organic chemicals that contribute to taste and odor problems
4. Ammonia and other nitrogenous compounds
5. Phosphorous compounds
6. Suspended material
7. Toxic and highly colored wastes

8. Oxygen demanding substances
9. Excessive heat
10. Foam-producing discharges
11. Other wastes which detract from recreational uses, esthetic enjoyment or other beneficial uses of the water.

On June 22, 1966, the conferees met to consider reports from the State water pollution control agencies on time schedules to implement this program of remedial action.

The State of Michigan submitted a detailed time schedule which was reviewed and approved by the Secretary of the Interior. Michigan's schedule calls for completion of construction of the municipal facilities by November 1970 and the industrial waste treatment facilities by January 1969, in the Detroit River area.

Michigan has made heroic strides in this direction and has had a very active program to accomplish the result.

I would like to point out for the benefit of the people here from the other States that we did have an enforcement conference on the Detroit River several years before we initiated the conference on Lake Erie, which took in the Detroit River, so we had some sort of a head start on the Detroit River.

But, considering the magnitude of the job, I think

Opening Statement - Mr. Stein

Michigan performed a water pollution control abatement job which I regard as second to none. There might be other jobs as complex, but certainly not any more complex in a metropolitan industrial area. Michigan has stipulations from, I believe, Detroit and several other cities, and more than 30 industries in the area, and if you look at the industries, it runs like the Who's Who of American Business.

They really have done a magnificent job in the area. I am sure that the other States will follow suit in their areas.

This third conference session has been called for the purpose of receiving and considering reports from the States of Indiana, Ohio, Pennsylvania, and New York, as well as Michigan, because there are some other areas there, on detailed time schedules for construction of treatment facilities on a plant by plant basis. We will also review progress toward compliance with all the conference recommendations in the five States concerned here.

In addition to that, the conferees established a Technical Committee to look into the nutrient problem of the lake and various other problems of Lake Erie. We, I expect. will hear a report from that Technical Committee today, and I think this may be an area of vital concern.

In coming here, I have just come back from the

Twin Cities area, Minneapolis-St. Paul. The question asked there was -- by the way, we came up with a time schedule within three or four years there -- "If we put in a remedial works, will the river be as good as new?" The answer to that is that once they put it into the works and you get a couple of spring runoffs down the Mississippi, that river will be fairly well scoured. Considering the industry and the amount of people within the area of that river, we expect the Mississippi River and its tributaries there, the Minnesota and the St. Croix, to be in pretty good shape.

We have a much more difficult problem -- and this should be pointed out -- in dealing with lake pollution. We have an aging process going on in Lake Erie. A good deal is not known about this process yet.

The point is, we believe we can slow down the aging process and perhaps arrest it. We are certainly not going to get a spring runoff to clean it up. The Technical Committee is addressing itself to this nutrient problem in the lake, because once we have a slowdown, we are going to have to make a judgment as to what level we are going to peg the lake at and keep it at that level, or perhaps improve it. This presents one of the most difficult problems to water resource people here.

Opening Statement - Mr. Stein

These people at the table are all old colleagues, as you will begin to see in some of the colloquies we have. I hope we will be able to finish this conference today, and that will be because most of us have worked together for about two decades now, and know each other rather well.

I think you realize that the Great Lakes, including Lake Erie, is the greatest single water resource we have. Not only this region, but the whole country is dependent on this fresh water resource, and if you are going to look at a critical water resource problem, this is, as far as I can see, the No. 1 problem, because I don't know where we would be in the nation if we ever lost this fresh water resource. We just have to protect it, and the Technical Committee report and some of our discussions here will relate to that.

A record and verbatim transcript will be made of the conference by Mr. Al Zimmer. Mr. Zimmer is making this transcript for the purpose of aiding us in preparing a summary, and also providing a complete record of what is said here. We will make copies of the summary and transcript available to the State agencies. We have found that, generally, for the purpose of maintaining relationships within the States, that the people who wish summaries and transcripts should request them through their State agency rather than come directly to the Federal Government. The reason for this is that when the conference has been concluded, we would prefer that the people who are interested in the problem to follow their normal relations in dealing with the State governments rather than the Federal Government on these matters. This has worked successfully in the past, and we will be most pleased to make this material available to the State for distribution.

I would suggest that all speakers and participants making statements, other than the conferees, come to the lectern and identify themselves for the purpose of the record.

Now, I wonder if we have any State Governors or Congressional representatives here

We do have, I understand, a representative of Congressman McCarthy here, Mrs. Robert Fierstein.

I wonder if she would come up and make a statement for the Congressman? Mrs. Fierstein?

STATEMENT OF REPRESENTATIVE RICHARD D. McCARTHY, 39TH CONGRESSIONAL DISTRICT OF THE STATE OF NEW YORK, AS READ BY MRS. ROBERT FIERSTEIN

MRS. FIERSTEIN: The following is a statement of Representative Richard D. McCarthy for presentation before

Hon. R. D. McCarthy

the third session of the Lake Erie Conference, March 22, 1967.

In August of 1965 a start was made toward pollution abatement in Lake Erie. The Federal-State enforcement conferences held in Cleveland and Buffalo gave us some hope that the sources of pollution degrading Lake Erie would be controlled.

In 1965 we were presented with the horrifying picture of pollution in Lake Erie. We were told of the vast quantities of sewage, industrial wastes, oils, silt, sediment, solids, and nutrients pouring into the lake daily. And we were told of the damages caused by these wastes.

Lake Erie beaches have been closed because of pollution. High quality fish have all but disappeared from the lake because of pollution. Water supplies have been damaged; esthetic values of Lake Erie and tributary streams have been significantly damaged in some areas; and pollution of Lake Erie even interferes with navigation.

This degradation of Lake Erie is for the most part man-made. There are millions of people living in communities throughout the Lake Erie Basin. And these communities discharge their wastes directly into the lake or into tributaries of the lake. In addition, hundreds of industries use the lake to carry away their wastes.

This picture of the pollution of Lake Erie is as accurate today as it was a year and a half ago.

Here in Western New York we have watched the deterioration of Lake Erie over the years. The people of this area are tired of seeing the senseless destruction of this precious natural resource, and they have made it clear that this pollution must end.

Certainly a start has been made toward a cleaner Lake Erie. We know what the problems are -- the previous conferences have spelled this out in detail. The immediate solutions have also been defined, and I believe that the Federal and State agencies are in agreement on what should be done. But we need more than agreement on what needs to be done -- we need immediate action to get it done.

This action to clean up Lake Erie will require participation at all levels of government. With the financial, technical, and enforcement assistance of the Federal and State governments, I believe that the individual municipalities and industries can accomplish the clean-up job required, and they can start now.

We must start now to build and improve the necessary treatment works. Further delay and lack of effective action may cause the lake to become so polluted that no remedial measures could correct the situation.

Thank you.

MR. STEIN: Thank you very much, Mrs. Fierstein, and I would hope that you would tell Congressman McCarthy that we appreciated his statement very much.

The reason for the little hesitation here was that I was hoping we would have Mr. Metzler, who just stepped out, to introduce you, but in the absence of that, I know he appreciates this statement too.

Are there any comments or questions?

(No response.)

MR. STEIN: If not, thank you very much for your statement.

MRS. FIERSTEIN: Thank you.

MR. STEIN: Are there any other Congressional or gubernatorial representatives?

(No response.)

MR. STEIN: I have a statement submitted here by the Chairman of the United States Section of the International Joint Commission, United States and Canada, Matthew E. Welsh, who wants this statement put in the record. He used to be Governor of Indiana.

I will move that we place this statement in the record as if read, if there is no objection.

I will pass this among the conferees, and if any of the conferees want the statement read after they look through it, we will be glad to do it. Otherwise, this will appear in the record as if read.

STATEMENT OF MATTHEW E. WELSH, CHAIRMAN, UNITED STATES SECTION, INTERNATIONAL JOINT COMMISSION, UNITED STATES AND CANADA

Inasmuch as all of the Great Lakes except Lake Michigan are international boundary waters, the solution of their pollution problems must be met by a cooperative effort of the Governments of the United States and Canada. This responsibility with respect to Lakes Erie and Ontario and the connecting channels has been delegated to the International Joint Commission - United States and Canada, and the purpose of this paper is to describe briefly just how the Commission functions and what is being done.

In the Boundary Waters Treaty of 1909 it was agreed, in effect, that neither the U. S. nor Canada would unilaterally make substantial changes in the management of their common system of boundary waters. It was further agreed that the boundary waters, and waters flowing across boundary, would not be polluted on either side to the injury of health or property on the other. The International Joint Commission was established by the Treaty as a permanent body to carry out its purposes, which are:

> "To prevent disputes regarding the use of boundary waters and to settle all questions which are now pending between the United States and the Dominion of Canada involving the rights, obligations, or interests of either...along their common frontier, and to make provisions for the adjustment and settlement of all such questions as may hereinafter arise, ..."

The International Joint Commission consists of three Canadian and three American members. Offices are maintained by the Commission in Ottawa and Washington.

While we are composed of two sections, it must not be assumed that these sections act as national delegations acting under instructions from their respective governments. We are a unitary body, and decisions taken and recommendations made are not arrived at on the basis of negotiation between two teams, but in the way a court would arrive at a decision according to the individual opinions of the commissioners after hearing evidence, making field inspections and having the benefit of studies made by technical boards.

The responsibilities of the International Joint

Commission relevant to this conference fall into two general categories. First is the duty, among other things, of approving or disapproving proposals for use, obstruction or diversions of boundary waters on either side of the line which affect the natural level or flow of boundary waters on the other side. The St. Lawrence Power Development required such approval.

Second is the duty of making investigations of and recommendations on specific problems when requested by either or both governments. It is under this provision of the Treaty that water and air pollution and lake level references to the International Joint Commission have been made.

As early as 1912, the two governments requested the Commission to investigate and report upon the extent, causes, location and remedies of pollution of all boundary waters, of which four of the Great Lakes are a part. The carrying out of the plan involved what was probably the most extensive bacteriological examination of waters the world had ever seen. After five years of investigation a comprehensive report was submitted on 12 August 1918, covering pollution of these international waters ranging from Lake of the Woods on the west to the St. Lawrence and St. John Rivers on the east, which recommended remedial measures to correct the gross pollution, both bacteriological and industrial, occurring at that time.

It is interesting to note that this International Joint Commission report, made some forty-eight years ago, after commenting that its comprehensive survey had disclosed "a situation along the frontier which is generally chaotic, everywhere perilous, and in some cases disgraveful," recommended, "...it is advisable to confer upon the IJC ample jurisdiction to regulate and prohibit this pollution of waters crossing the boundary."

The governments accepted the report and requested the International Joint Commission to prepare a draft of convention to confer upon it or other agencies the necessary authority to remedy existing conditions. This draft was submitted on 20 October 1920. It would have authorized the International Joint Commission to "enquire and determine whether any person is polluting -- the waters in breach of -- the Treaty," hold hearings and report the results. The International Joint Commission would also be authorized to define standards for apparatus for disinfection of sewage of vessels, and the governments would have agreed not to license vessels in these waters which failed to meet these standards.

However, in the aftermath of World War I, no action was taken by the two governments on these recommendations. The International Joint Commission was powerless to proceed in the absence of any water pollution references by the two governments, and it took no further action in this area until 1946.

In the meantime, since its suggestion that the International Joint Commission be granted broad investigative powers had been shelved by the governments, the International Joint Commission developed another method of attacking water problems, namely, by the appointment of international boards. This technique has permitted it to enlist the capabilities of the established governmental agencies in both countries active in the field of control of water levels and water quality. These boards are established by the International Joint Commission and are made up of the best available talent from Federal, State and provincial agencies. This encourages an exchange of information, coordination of efforts, and ultimately, cooperation in the solution of these problems of mutual concern.

After a board has completed the specific technical investigation with which it is charged by the International Joint Commission, the Commission typically holds public hearings upon its report and then proceeds to prepare a recommendation to the two governments which it believes is technically sound and in keeping with the high standards set by previous reports of the Commission. In other words, the

International Joint Commission sees that a competent board is appointed, supervises the work of its board, holds hearings upon the board's findings and then prepares the final report and recommendations to the two governments for action.

Frequently the final report to the governments will recommend that the International Joint Commission be authorized to appoint a supplementary technical board to give continuing surveillance and thus insure orderly operation of a project or supervision of the solution of a problem. This procedure of "follow-through" was originally perfected by the International Joint Commission in connection with a number of water regulation references, where International Boards of Control were created. The Columbia, Niagara and St. Lawrence River Boards of Control are examples.

In 1946, some twenty-eight years after the first report of the International Joint Commission on pollution of the boundary waters, when the water problems associated with the growth of population and industrial expansion led to renewed demands for further examination of pollution conditions in the connecting channels of the Great Lakes at Sault Ste. Marie, the St. Clair and Detroit Rivers and in the Niagara area, another investigation was commenced pursuant to references by the two governments. Three years of field surveys, studies and conferences were conducted, public hearings were held, and a report to the governments was completed in October 1950. It included recommended "Objectives for Boundary Waters Quality Control," which were regarded as a landmark development in the struggle for water quality, that would preserve the utility of the waters for domestic and industrial water supplies, navigation, fish and wildlife, bathing, recreation, agriculture and other riparian activities. The report, including its recommendations, was accepted, and two surveillance boards appointed, one for the Superior-Huron-Erie section, including the connecting channels, and another for the Erie-Ontario section and its connecting channel, to supervise the program of obtaining compliance with the objectives.

These boards, composed of men from Federal, State and provincial agencies in the United States and Canada, charged with pollution enforcement, embarked upon a program of conferences with the cities and industries on each side of the border. Recent technical developments lead the Commission to believe that compliance with its objectives may well be achieved by the end of 1970, assuming adequate financing is available in both countries and that the promise of recent pilot projects is borne out in large-scale tests. However, we will still be faced with the task of cleaning up the accumulated pollution.

A similar program of much greater magnitude and complexity is now under way with respect to pollution in Lake Erie, Lake Ontario and the International Section of the St. Lawrence River, commenced as a result of a reference to the International Joint Commission made by the two governments on 7 October 1964. Early analysis by the International Joint Commission technical boards disclosed that the gravity and urgency of the situation was sufficient to warrant a departure from normal procedure, rresulting in the issuance of an International Joint Commission Interim Report in December 1965, which described the situation in Lake Erie to be "serious and deteriorating." The urgency of the situation is fully appreciated by all of the agencies in each country who are participating, and field investigation by work parties of the two International Joint Commission boards is proceeding on a crash basis.

To give you an idea of the gravity of the crisis which confronts us, let me call your attention to the estimated time required just to clean up the mess which has been created. After our cities and industries have complied with the water quality objectives into Lake Erie, technical people predict it will still take three changes of the lake's water to flush the existing pollution, i. e., about ten years. Lake Michigan's water changes only once each 100 years and Lake Superior every 200 years, so it is quite evident that under no circumstances can they be permitted to become polluted because it would take several generations to clean them up.

In conclusion, to give you some comprehension of the magnitude of this Reference, the areas of investigation that are being carried out are:

a. Deep water surveys
b. In-shore pollution
c. Recreational areas
d. Pollution loadings from all tributaries
e. Municipal and industrial waste loadings
f. Biological investigations (i. e. eutrophication)
g. Physical, limnological studies of the lakes.

The International Joint Commission boards doing this work are composed on the U. S. side of men from the Federal Water Pollution Control Administration and from the pollution control agencies of the various States concerned. The Canadian section of these boards is composed of men from the Department of National Health and Welfare, Department of Mines and Technical Surveys, Department of Fisheries and the Ontario Water Resources Commission.

It is going to take the fullest possible coordination of all agencies at all levels of government to obtain the data that is necessary for an informed and intelligent approach to this problem, which strikes at the very heart, in my judgment, of the future of the Great Lakes system.

A period of intensive investigation and study is ahead of us. It is expected that the appropriate agencies will cooperate with the International Joint Commission boards and carry out these surveys and pool all data for assessment and evaluation, and all involved are cooperating actively in this effort.

The fact that it took the two governments twenty-eight years (1918 to 1946) after the first International Joint Commission report on pollution of boundary water, which found conditions "chaotic and disgraceful," to get up enough courage to ask it to take another look is eloquent evidence of the lack of public concern during this period. And the fact that it then took another sixteen years for the governments to progress from the formulation of water quality objectives by the International Joint Commission in the boundary channels reference in 1950 to a point where compliance in these connecting channels can only now be foreseen, is indicative of just how great the need has been for better enforcement techniques. An aroused public now demands vigorous action, and it is anticipated that recent legislation at the Federal, State and provincial levels in both countries will permit much faster progress in the future.)

MR. STEIN: At this point we would like to call on Mr. Poston, the Federal conferee.

STATEMENT OF H. W. POSTON, CONFEREE AND
ACTING REGIONAL DIRECTOR, GREAT LAKES
REGION, FEDERAL WATER POLLUTION CONTROL
ADMINISTRATION, DEPARTMENT OF THE INTERIOR

MR. POSTON: Thank you.

We are here today to receive and consider reports on time schedules for construction of treatment facilities and to evaluate progress toward pollution control in the Lake Erie Basin. A year and a half has elapsed since we met here in Buffalo. The conferees unanimously agreed then that Lake Erie and many of its tributaries are polluted and the main body of the lake has deteriorated in quality at a rate many times greater than its normal aging process.

This is the third enforcement conference in which I have participated during the past two weeks, and I have witnessed encouraging progress at these sessions in Minneapolis and Chicago. I am optimistic today that these waters can be cleaned up and that they can be kept clean. My optimism is based on two things that have happened within the past two years. First, we have had momentous Federal and State legislation. On the Federal level the Water Quality Act of 1965 and the Clean Waters Restoration Act of 1966. Second, we have seen a marked change in public awareness and there is now overwhelming public sentiment in support of clean water.

Let me elaborate briefly on these points. The requirement establishing water quality standards on interstate waters throughout the country was brought about by the Water Quality Act of 1965. This represents a major departure in water pollution control.

In taking this unprecedented step the Congress said, in effect, that water pollution in this country has gone far enough. The time has come to call a halt. From here on there are going to be standards of quality for all major lakes and streams of this country, and those standards are going to be enforced. This task is now at a crucial stage, and we in the Federal Water Pollution Control Administration are doing everything we can to help the States carry out the letter and spirit of the law. There is much at stake, and time is running out. The purpose of the Water Quality Standards provision is both preventive and curative. Reduced to fundamentals, the object is to preserve those waters that are still clean and to restore to acceptable levels of cleanliness those waters that have become polluted.

The enactment of the Clean Waters Restoration Act of 1966 marked the beginning of a new offensive in America's war on pollution. This landmark legislation makes it quite clear that the Federal Government is prepared to do more than it ever did before to win the battle for clean water. At the same time, the Federal law calls for a comparable all-out effort by the States, the local municipalities, and American industry. Although the solution to pollution is not merely opening the flood gates of the Federal treasury, much greater Federal financial assistance is now available than ever before.

The amendment of 1966 contained authorization for Federal grants for research and development. Under the combined sewer program, over 8 million dollars in grants has been awarded to cities for projects they proposed and helped finance to demonstrate new methods of coping with this problem. Fourteen cities and local government districts were awarded grants for demonstration and research projects on advanced waste treatment processes. I just received word that a demonstration grant for removal of phosphates at the Trenton, Michigan, sewage treatment plant has been made.

There is also authorization under the 1966 amendment for doubling the amounts of monies given to the State Water Pollution Control Agencies for furtherance of their programs. These program grants are to be utilized by the State agencies for the extension of their programs.

The new amendment included new provisions relative to the section dealing with grants for construction of municipal waste treatment plants. The dollar limitation on the amount of Federal funds in the project will be removed on June 30 and the limitations will then be on a straight percentage basis of the total eligible project cost. The new amendment authorizes greatly increased appropriations for next year and gradually increases the annual authorization to 1-¼ billion by 1971. The exact amounts that will be available each year are determined when Congress rules on the Federal Budget.

One other indication that the Federal Government means business and intends to do its share in the cleanup is supported by the regulations governing tax credit for construction of industrial water pollution control facilities. Water pollution abatement works have been exempt from the suspension of the investment tax credit if certain conditions are satisfied. This means that under certain conditions, industries can deduct up to seven percent of the cost of new waste treatment plant construction from its income tax liability. This is certainly an additional incentive for industries to move ahead now in the cleanup program. To date only a few firms have sought information concerning the procedures to be followed.

The second significant change, that of the change in public awareness has simply been a general raising of the sights as to what can and should be done. People in this area have come to realize that something must be done now to protect and improve their precious heritage of clean water. I think it can be said that the people are more aware now than ever before of water pollution problems. Public debate no longer centers on whether or not we can afford the cost of waste treatment; the question is now, "How soon can the job be done?" I am convinced that the citizens of this country want action now to restore the quality of the waters to an acceptable level and then make sure they are kept there.

Most of the problems that existed at the time of our last meeting here in Buffalo still exist today; although some of the problems are on the way toward corrective action. Many cities and industries have already initiated actions recommended at earlier sessions of this conference. Much has been said about Lake Erie's deterioration and the responsibilities we have to our heritage -- an abundant and priceless supply of clean water. The Federal Water Pollution

Control Administration is vitally interested in seeing that the waters of Lake Erie are restored and protected for the future.

I believe that we as conferees, meeting here today, have an opportunity to go forward in this war against water pollution. We have been given the tactical weapons to do this. We have strengthened Federal, and in many instances, State legislation; and we have overwhelming public support. That is why I said at the outset I am optimistic that these waters can be cleaned up -- and kept clean.

The Federal Water Pollution Control Administration has certain direct responsibilities in the Lake Erie Enforcement Area; and in regard to these responsibilities I will call upon Mr. Grover Cook, Chief Enforcement Officer of the Great Lakes Region, to report.

STATEMENT OF GROVER W. COOK, CHIEF OF
ENFORCEMENT, GREAT LAKES REGION, FEDERAL
WATER POLLUTION CONTROL ADMINISTRATION,
DEPARTMENT OF THE INTERIOR, CHICAGO, ILLINOIS

MR. COOK: Mr. Chairman, Conferees, Ladies and Gentlemen:

There are several areas of Federal activities to be reported at this session of the conference: the surveillance program recommended by the Secretary in the Summary of the August 11, 1965, conference; status of compliance at Federal installations, and progress being made toward eliminating pollution from the dumping of dredged material in the lake.

First of all, surveillance. The objective of the program, which is now under way, is to evaluate the effectiveness of pollution control practices in local and lake-wide situations.

Surveillance of the Detroit River and western Lake Erie has been carried out since 1963 as a function of the Detroit River and Michigan waters of Lake Erie enforcement conference. A comparison of 1963 and 1966 water quality data in that area indicates that there has been no significant change.

Surveillance in the other parts of the lake is under way, but at this time there are not enough data available to determine any trends in water quality. However, since the last meeting of the conferees I made two aerial surveys of the western and west central basins and observed dense algal blooms in those areas. Also the Technical Committee flew over the island area and the south shore west from Cleveland in October of last year and observed the luxuriant Cladophora growths in the shallow waters. Obviously, there has been no perceptible improvement since our studies of 1964 and 1965.

There was also an occurrence of short filter runs at almost every water treatment plant drawing water from the lake. The problem was particularly severe at Cleveland and Erie, Pennsylvania.

The present monitoring program involves routine sampling at eight stations in the Michigan waters of the lake and thirty stations along the lake's long axis. Both water and bottom sediments are being sampled for chemical, biological and physical determinations. Sampling will be adjusted so that it is done (1) with western basin ice cover, (2) within a month after ice break-up, (3) at the time of maximum thermal stratification development in the central basin, and (4) just after fall stratification break-up in the central basin.

Near-shore lake waters, primarily in the vicinity of harbors and tributaries, will also be sampled, approximately forty stations. Chemical, physical, biological and microbiological analyses will be made. An automatic monitoring station for near-shore water quality is to be established late this calendar year at Eastlake, Ohio.

The Federal Water Pollution Control Administration will work closely with State agencies, which are expected to provide municipal and industrial discharge data. The Federal Water Pollution Control Administration will in turn provide its data to those agencies.

In addition, a program is under way in cooperation with the United States Army Corps of Engineers, to evaluate the effects of current and potential harbor dredging practices on the water quality of Lake Erie.

As for the status of compliance by Federal installations, Recommendation No. 24 of the Conference Summary requires that needed waste treatment facilities at Federal installations are to be completed and in operation by August 1966. This recommendation is supported by Executive Order 11288, which requires that all Federal installations provide secondary waste treatment facilities in addition to providing leadership in pollution abatement.

The majority of the Federal installations in the conference area discharge waste water to municipal sewer systems. All other installations have installed adequate waste treatment facilities or initiated satisfactory abatement programs in accordance with Executive Order 11288 and the Conference Summary. All installations, with one exception, are presently in compliance with the conferees' recommendations. The one not in compliance is the NASA Lewis Research Center, Plum Brook Station, Sandusky, Ohio, which provides only primary treatment. The original plan to provide secondary treatment facilities at this installation called for completion of construction early in the summer of 1967. However, the proposals submitted to the Federal Water Pollution Control Administration in December of 1966 did not provide for facilities with capability for phosphate removal. NASA officials have re-evaluated the proposal and now plan to construct secondary treatment facilities incorporating chemical precipitation for phosphate removal. The present time schedule requires completion of design and award of the construction contract by June 30, 1967, with the plant in operation by early 1968.

Approximately 45 Federally owned and operated vessels equipped with sanitary facilities frequent the waters of Lake Erie. Twenty-seven of these vessels have macertator-chlorinator units presently installed. Ten additional vessels will have similar treatment devices installed by summer. Three Corps of Engineers vessels, all of which have secondary treatment facilities designed and installed by early 1968. No waste treatment facilities are presently under design or programmed for several large U. S. Coast Guard buoy tenders. The installation of adequate vessel waste treatment facilities is, in many cases, awating the results of research projects being conducted by the Navy and the Coast Guard.

Urban renewal sewer projects and interstate highway construction projects are now reviewed to assure compliance with the conference recommendation prohibiting construction of combined sanitary and storm water sewers.

As for disposal of dredged material, considerable attention has been given to the subject of the disposal of dredged material since the conferees last met, and the Department of the Army and the Department of the Interior have reached an agreement on a program and plan for attacking the problem of the disposition of polluted material dredged from harbors on the Great Lakes. I would like to enter into the record the news release which fully describes the agreement and only briefly summarize the provisions today.

MR. STEIN: Without objection, this will be entered into the record as if read.

(The news release referred to is as follows:

UNITED STATES

DEPARTMENT OF THE INTERIOR

News Release

DEPARTMENT OF THE INTERIOR

DEPARTMENT OF THE ARMY

For Release March 1, 1967

JOINT PUBLIC STATEMENT BY THE DEPARTMENTS OF THE INTERIOR AND ARMY REGARDING DREDGING ON THE GREAT LAKES

The Department of the Army and the Department of the Interior have reached agreement on a program and plan for attacking the problem of the disposition of polluted material dredged from harbors on the Great Lakes. The agreement covers an interim program, effective immediately for calendar year 1967, and a permanent plan of action to be implemented as rapidly as alternate procedures can be developed, tested and funded. The Federal agencies charged with carrying out the agreement are the Corps of Engineers for the Department of the Army, and the Federal Water Pollution

Control Administration (FWPCA) for the Department of the Interior.

By acts of Congress, the Corps of Engineers is responsible for improvement and maintenance of the waterways of the United States in the interest of navigation. These waterways are life-lines of America's growth, industrial might and prosperity and their proper maintenance is an exceedingly important responsibility of the Corps. The Corps of Engineers recognizes that considerable time will be required before complete treatment of municipal and industrial waste will prevent the introduction of pollutants to the waterways. During this time a means must be found to keep the waterways open. Doing so involves dredging of polluted material. The Corps is therefore studying alternate procedures for the disposal of the polluted dredging resulting from these industrial and municipal wastes.

The Department of the Interior (FWPCA) by Congressional acts has the responsibility to enhance quality and value of all water resources and to carry out, in cooperation with State and local governments, a national program aimed at the prevention, control and abatement of water pollution. Additionally, by Executive Order No. 11288, the Department of the Interior shall provide technical advice and assistance to heads of other Departments. who are to provide leadership in the nationwide effort to improve water quality through prevention, control and abatement of water pollution from Federal Government activities.

The two agencies agree that joint effort is required for the development of acceptable alternative disposal means with the ultimate objective of providing leadership in the nationwide effort to improve water quality through prevention, control and abatement of water pollution by Federal water resources projects.

In order to maintain navigation, the Corps of Engineers will proceed with dredging in calendar year 1967 on 64 of the 108 channel and harbor projects in the Great Lakes. A list of these 64 projects is given at the end of this release. While some of these projects are seriously contaminated, disruption of local and national economies would result if dredging were to be deferred this year; and alternate disposal methods cannot be developed and funded in time. Detailed observation and measurement of the polluting characteristics will be jointly conducted by the two agencies during the dredging operations. These observations will include water and material sampling at the dredging site before and after dredging operations and selected sampling en route and at disposal areas with the objective of evaluating the effects of the operations. The analysis of the samples will be done by the Federal Water Pollution Control Administration. These studies will serve to guide plans for alternate methods thereafter.

For the longer range permanent plan, the Corps of Engineers will initiate a pilot program of experimentation in March 1967. An amount of $1 million has been made available for this program during fiscal year 1967, and the President's budget includes $5 million for continuation of the program during fiscal year 1968. The purpose of this program is to develop with the aid of consultants, the most practicable methods for management of pollution problems related to dredging operations on the Great Lakes that will be consistent with the objectives of cleaning up our rivers and lakes. The Department of the Interior is in agreement with the pilot program and will participate in it. The pilot program will investigate all alternate disposal methods, such as along-shore diked areas, disposal at some distance inland from the shore, and treatment methods, and evaluate pollution abatement results.

Five localities have been selected for institution of the pilot program. The Green Bay project, where scheduled disposal in an away-from-shore land site will permit development of acceptable means of treating the polluted drainage from such an area; the Cleveland project, which has a high pollution index and where a favorable opportunity exists for field experimentation with the dike types; Toledo; and Detroit's River Rouge, where existing near-shore diked areas are in use and where the Toledo site represents an intermediate pollution index; and Great Sodus Bay where there is a low pollution index. In the Chicago area, the use of on-shore disposal areas shows great promise and such areas are being actively explored in connection with the forthcoming maintenance dredging on the Calumet River. The work at these selected areas in 1967 will provide a full-scale test of ways for filtering the liquids draining back into the lake from such areas, as well as confining the solids.

When acceptable alternate methods of dredge disposal have been agreed upon, and at the earliest possible time, the Corps will take appropriate budgetary action to secure the necessary funds. This may require substantial funds programmed over a period of several years.

The Federal Water Pollution Control Administration will contribute to the pilot study effort by providing leadership in the development and implementation of an effective program for measuring the pollutional effects of the materials to be dredged. Skilled personnel, as well as fixed and mobile laboratory facilities of that agency, will be made available to analyze these materials for chemical, biological, physical and other characteristics and thus determine the effectiveness of the various methods proposed.

In carrying forward the nationwide Federal-State-local program to prevent, control and abate pollution in our rivers, lakes and coastal waters, the Department of the Interior will further utilize all of its resources and powers in the support of measures which prevent pollution at the source. By June 30, 1967, the States will submit quality standards and plans for their implementation for approval by the Secretary of the Interior. As State plans of implementation get under way, it is expected that the quantity of polluting materials from municipal, industrial and other sources deposited in navigable waters will be drastically reduced. Thus, the pollutional effects of dredging will be reduced in direct ratio to the success of the nationwide control effort and improved methods of spoil disposal.

The agreement announced today reflects the determination of the two agencies to present an example of what the Federal Government must do to help preserve the incomparable values of the Great Lakes Water resources.

Estimated Dredging Requirement - Calendar Year 1967

Lake Ontario   Projects: Rochester Harbor, N. Y.; Oswego

Harbor, N.Y.; Great Sodus Bay Harbor, N. Y.; Little Sodus Bay Harbor, N. Y.

Lake Superior Projects: Duluth-Superior Harbor, Minn. & Wis.; Ontonagon Harbor, Mich.; Big Bay Harbor, Mich.; Cornucopia Harbor, Wis.; Grand Traverse Harbor, Mich.; Keweenaw Waterway, Mich.; Presque Isle Harbor, Mich.; Whitefish Point Harbor, Mich.; Little Lake Harbor, Mich.

Lake Michigan Projects: Calumet Harbor and River, Ill. & Ind.; Indiana Harbor, Ind.; Green Bay Harbor, Wis.; Two Rivers Harbor, Wis.; Kenosha Harbor, Wis.; Muskegon Harbor, Mich.; Ludington Harbor, Mich.; Frankfort Harbor, Mich.; St. Joseph Harbor, Mich.; Grand Haven Harbor, Mich.; Manistee Harbor, Mich.; Waukegan Harbor, Ill.; Michigan City Harbor, Ind.; Manitowoc Harbor, Wis.; Sturgeon

G. W. Cook

Bay & Lake, Michigan Ship Canal, Wis.; Menominee Harbor, Mich. & Wis.; Holland Harbor, Mich.; New Buffalo Harbor, Mich.; Racine Harbor, Wis.; Port Washington Harbor, Wis.; Kewaunee Harbor, Wis.; Pentwater Harbor, Mich.; Saugatuck Harbor, Mich.; South Haven Harbor, Mich.; Charlevoix Harbor, Mich.; Sheboygan Harbor, Wis.; Milwaukee Harbor, Wis.; Maitowoc Harbor, Wis.; White Lake Harbor, Mich.

Lake Erie Projects: Cleveland Harbor, Ohio; Toledo Harbor, Ohio; Lorain Harbor, Ohio; Sandusky Harbor, Ohio; Fairport Harbor, Ohio; Ashtabula Harbor, Ohio; Black Rock Channel & Tonawanda Harbor, N. Y.; Conneaut Harbor, Ohio; Huron Harbor, Ohio; Erie Harbor, Pa.; Monroe Harbor, Mich.; Rocky River Harbor, Ohio; Dunkirk Harbor, N. Y.; Bolles Harbor, Mich.

A decision respecting Buffalo Harbor will be made at a later date.

Lake Huron & Connecting Channels

Projects: Channels in Lake St. Clair, Mich.; Detroit River, Mich.; Saginaw River, Mich.; Rouge River, Mich.; Alpena Harbor, Mich.; Cheboygan Harbor, Mich.; AuSable Harbor, Mich.)

MR. COOK: The agreement covers an interim program, effective immediately for calendar year 1967, and a permanent plan of action to be implemented as rapidly as alternate procedures can be developed, tested and funded. The Federal agencies charged with carrying out the agreement are the Corps of Engineers for the Department of the Army, and the Federal Water Pollution Control Administration (FWPCA) for the Department of the Interior.

In order to maintain navigation, the Corps of Engineers will proceed with dredging in calendar year 1967 on 64 of the 108 channel and harbor projects in the Great Lakes. While some of these projects are seriously contaminated, disruption of local and national economies would result if dredging were to be deferred this year; and alternate disposal methods cannot be developed and funded in time. Detailed observation and measurement of the pollution characteristics will be jointly conducted by the two agencies during the dredging operations. These observations will include water and material sampling of the dredging site before and after dredging operations and selecting sampling en route and at disposal areas with the objective of evaluating the effects of the operations. The analysis of the samples will be done by the Federal Water Pollution Control Administration. These studies will serve to guide plans for alternate methods thereafter.

For the longer range permanent plan, the Corps of Engineers has initiated a pilot program of experimentation. The purpose of this program is to develop, with the aid of consultants*, the most practicable methods for management of pollution problems related to dredging operations on the Great Lakes that will be consistent with the objectives of cleaning up our rivers and lakes. The Department of the Interior is in agreement with the pilot program and will participate in it. The pilot program will investigate all alternate disposal methods, such as along-shore diked areas, disposal at some distance inland from the shore, and treatment methods, and evaluate pollution abatement results.

Five localities have been selected for institution of the pilot program. In the Chicago area, the use of on-shore disposal areas shows great promise and such areas are being actively explored in connection with the forthcoming maintenance dredging on the Calumet River. The work at these selected areas in 1967 will provide a full-scale test of ways for filtering the liquids draining back into the lake from such areas, as well as confining the solids.

When acceptable alternate methods of dredge disposal have been agreed upon, and at the earliest possible time, the Corps will take appropriate budgetary action to secure the necessary funds. This may require substantial funds programmed over a period of several years.

The Federal Water Pollution Control Administration will contribute to the pilot study effort by providing leadership in the development and implementation of an effective program for measuring the pollutional effects of the materials to be dredged. Skilled personnel, as well as fixed and mobile laboratory facilities of that agency, will be made available to analyze these materials for chemical, biological, physical and other characteristics and thus determine the effectiveness of the various methods proposed.

In carrying forward the nationwide Federal-State-local program to prevent, control and abate pollution in our rivers, lakes and coastal waters, the Department of the Interior will further utilize all of its resources and powers in the support of measures which prevent pollution at the source. By June 30, 1967, the States will submit quality standards and plans for their implementation for approval by the Secretary of the Interior. As State plans of implementation get under way, it is expected that the quantity of polluting materials from municipal, industrial and other sources deposited in navigable waters will be reduced in direct ratio to the success of the nationwide control effort and improved methods of spoil disposal.

The agreement between the Department of the Army and the Department of the Interior reflects the determination of two agencies to present an example of what the Federal Government must do to help preserve the incomparable values of the Great Lakes Water resources.

MR. STEIN: While we are giving the conferees a chance to collect themselves and determine whether they want to ask any questions or have any comments, I would like to take this opportunity, while we are all here, to introduce first a member of the President's Advisory Board, who has come here from Pennsylvania, Mr. Everett Zurn.

Mr. Zurn has been very helpful in dealing with the national and the local program, and serves on the President's Advisory Board. He always does his homework and always goes beyond the call of duty, such as checking up on us here.

In addition, from Pennsylvania, Mr. Larry Miller is accompanying Mr. Walter Lyon, and from Michigan an old friend and colleague, Mr. Ralph Purdy, is accompanying Mr. Oeming. Mr. Perry Miller of Indiana is accompanying Mr. Blucher Poole.

Considering the nature of the problem, with Mr. Purdy and Mr. Miller, we probably have the top industrial waste consultant team right with us today. We are very glad to welcome them as participants in the conference.

Are there any questions or comments of Mr. Cook? Mr. Metzler?

MR. METZLER: I really was very much interested in Mr. Cook's flight over the beaches west of Cleveland, and his report that there was no perceptible improvement in the lake since 1964-65. I wondered whether his remarks were related to the visual condition of the beaches in this area over which he flew, or whether they were related -- I didn't read the statement; I just listened -- to the wider area, that there has been no improvement in Lake Erie?

MR. COOK: The statement was based partly on visual observations over quite a few flights and surveys from boats, but probably more than that, from the data that has been obtained by other surveillance in western Lake Erie.

I should have 1963, incidentally. Those studies were started in 1963 and not 1964.

The data indicates that there is practically no change. Water quality characteristics, such as coliforms, phosphates, and right down the line, about 10 or 12 different characteristics, are the same as they were in 1963.

MR. METZLER: All right.

MR. STEIN: Are there any further comments or questions?

MR. LYON: Mr. Chairman, your comments in your opening statement, where you so correctly pointed out the difference between a flowing stream and a lake, and then Mr. Cook's comments about the Corps' studies to see what they can do to improve their dredging methods, made me think about the question as to whether or not we ought not to consider to ask the Corps to study the feasibility of dredging the bottom sludges out of Lake Erie.

I know this is almost a fantastic thing to even think about, but we do know that the lake acts as a nutrient trap. I wonder whether this ought to at least not be studied to see whether it is at all possible. I know it has not been.

MR. STEIN: I think we should hear possibly from the conferees on this.

Are there any comments or questions?

MR. EAGLE: Well, I certainly would agree with this. This matter should be studied to determine the feasibility and practicability of removing some of these sludges from the bottom of the lake.

MR. STEIN: Mr. Metzler?

MR. METZLER: Since I probably know less about Lake Erie than any other conferee, I would be interested first in knowing what contribution those sludges are making, if any, to the pollution of Lake Erie. I would not want to support any proposed study of the cost of dredging the bottom of Lake Erie until someone had some evidence that those sludges were contributing to the pollution of Lake Erie.

Now, if you have this, I am not aware of it.

MR. POOLE: I think I would want to think about this a little, and perhaps wait and see how the lake begins to act after we take the pollution that is going into it daily, out. Maybe a reappraisal a few years after that is done would put an entirely different light on it, but just to come in here and vote as one conferee now for the study of the cost of dredging Lake Erie, I would like to wait a little while.

Maybe that's because I am getting old.

MR. OEMING: Mr. Chairman, there is one thing that strikes me.

As I understand it, the Corps of Engineers does dredging for the benefit of navigation. I think that is their authorization, and I wonder whether this authorization to do this work would extend to the point of dredging deposits out of the bottom of the lake where they do not interfere with navigation.

MR. STEIN: I don't know if we have any Corps representative here. Is Colonel Neff here?

Colonel, you may want to speak as to the Corps' jurisdiction.

This is what the Corps generally does, and this is very true. However, the Corps of Engineers does work for a variety of purposes.

We, for example, for years have always regarded the Corps as one of our sister agencies. We are now a construction agency ourselves, and we have considered the Corps as our construction arm.

The way Corps projects are authorized generally is under what we used to call the Rivers and Harbors Act. The Corps has undertaken several water quality projects for us, notably in the Southwest, which were not necessarily related to navigation.

Now, while this can be done, this is unusual for the Corps, but there is a precedent for it.

The Corps of Engineers, as we all know, in peace and war has demonstrated itself as one of the most flexible agencies that we have in the country. If there is an engineering job and we can assign it to the Corps, they are going to do it.

Do you want to say anything to that, Colonel?

STATEMENT OF COLONEL R. WILSON NEFF, DISTRICT ENGINEER, CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY

COLONEL NEFF: Mr. Chairman, Conferees, Ladies and Gentlemen:

I do not have a prepared statement. I have only a brief word to say.

With regard to your question regarding or about an authorization, we would not have the authority to do the type of project that you are talking about without special Congressional authorization, both for study and work, so that this would be an area of new endeavor for us.

I could not speak to whether this should be done. This is a decision for the conferees, but it would require a new and separate authorization.

Are there any other questions that you would like to ask of me at this time?

MR. STEIN: Are there any? Do you want to make a comment now?

MR. OEMING: Well, Mr. Chairman, I am inclined to agree with Mr. Poole, that at this stage of the game I would not like to see the Corps given this job until we are more fully aware of what the benefits would be to undertake a project of this magnitude.

MR. STEIN: Well, if this is the view, we can bring this up in the conferees' discussion.

Thank you very much.

I can give you a little experience we have had in another area of the Potomac River, which is not exactly analogous to this, but is an estuary.

When we first started our program in the Potomac in the 1950's, we had tremendous sludge banks, and we were thinking in terms of exploiting the possibility of cleaning those out after the treatment works were in, because there we definitely found deleterious effects as a result of the sludge banks covering up the fish breeding grounds, and so forth and so on.

Since then, we have had improved collection and treatment systems in the Washington metropolitan area, and are completing at least the first stage of our construction program. We are examining the Potomac River again, and we have found material changes in the sludge banks, unless our measurements were really awry when we started, because the sludge banks that we used to find of 10 and 20 feet deep are no longer there.

Now, this may be because it is a river or because it is a tidal action, but this might be an indication that after the works are in, we have a different kind of problem that might be evaluated at the time.

I don't know if this is applicable here.

MR. LYON: Well, this is a lake.

MR. STEIN: Yes.

MR. LYON: I don't want to prolong this, but I think Mr. Metzler asked the question of what happens to the sludges. I don't think any of us are certain.

Clair Sawyer, who is one of the experts in this field, and who provided a lot of the bases for the report of the Technical Committee, in 1965 presented a paper at the Water Pollution Federation, where he said, and if I may read this one paragraph:

> "Of the nutrients which enter the lake, a major part becomes incorporated into algae and other forms of life which eventually die and settle to the lake bottom. There they are digested by bacteria; protozoa, worms, etc., with much of the nutrient materials solubilized. They then are free to leach back into the waters above and eventually become available to support further phytoplankton growths. The amount of nutrients which recycle from the bottom muds, of course, is proportional to the amount of material which drops to the mud from above."

I think at least he tried to answer that question.

MR. OEMING: Mr. Chairman, may I have a comment while Mr. Cook is up here?

MR. STEIN: Yes.

MR. OEMING: While the press release that was issued jointly by the Department of the Interior and

Department of the Army was not read here, I have read it, and I have just one comment, Mr. Cook.

I would expect that you will recognize in your study that there is a difference in the quality of the polluting materials from these various harbors that are listed here.

For example, I realize when you write something like this, you can't go into detail, but I point out that improvement may be expected in some of these dredges by some of the programs that the States are on.

I would think that this ought to recognize the fact that there are many of these harbors that probably will not change materially because of the existing situation, because of the present degree of pollution control here; that is, there are still going to be dredges, but they are not going to be the same quality of dredging that comes out of the Rouge River. You cannot compare this with what might come out of White Lake Harbor or Muskegon Harbor, where they are not of the same degree of polluting potential. Yet there will be a polluting potential there by reason of the silt that enters these harbors naturally. This study will take into account that even with the best of treatment, there still will be polluting materials coming into the lake.

MR. COOK: Oh, yes, and the fact that the

MR. LYON: I don't want to prolong this, but I think Mr. Metzler asked the question of what happens to the sludges. I don't think any of us are certain.

Clair Sawyer, who is one of the experts in this field, and who provided a lct of the bases for the report of the Technical Committee, in 1965 presented a paper at the Water Pollution Federation, where he said, and if I may read this one paragraph:

> "Of the nutrients which enter the lake, a major part becomes incorporated into algae and other forms of life which eventually die and settle to the lake bottom. There they are digested by bacteria; protozoa, worms, etc., with much of the nutrient materials solubilized. They then are free to leach back into the waters above and eventually become available to support further phytoplankton growths. The amount of nutrients which recycle from the bottom muds, of course, is proportional to the amount of material which drops to the mud from above."

I think at least he tried to answer that question.

MR. OEMING: Mr. Chairman, may I have a comment while Mr. Cook is up here?

MR. STEIN: Yes.

MR. OEMING: While the press release that was issued jointly by the Department of the Interior and quality or the types of pollutants that are involved in each of these harbors may be very different.

We have made an evaluation of all of the harbors, with the exception of a few, and are very much aware of this. Yes.

MR. OEMING: This could give the impression that all of these harbors are equally polluted.

MR. COOK: Not at all. Some of them are very clean. Some of your Michigan harbors are very clean.

MR. OEMING: I am not pointing at Michigan harbors. I am pointing at all of the harbors.

MR. COOK: Incidentally, Mr. Chairman, I do have this report that I mentioned from which we obtained our data, which is a comparison of 1963 and 1966. We have it available for the conferees, if they would like to take it home with them.

MR. STEIN: I would suggest you give it to the conferees during the recess.

Are there any further questions or comments?

(No response.)

MR. STEIN: If not, thank you very much, Mr. Cook.

MR. POSTON: I would like to ask Mr. George Harlow, who is Chairman of the Technical Committee, to give a summary or a report on the Technical Committee activities.

STATEMENT OF GEORGE L. HARLOW, DIRECTOR, LAKE ERIE PROGRAM OFFICE, FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, DEPARTMENT OF THE INTERIOR, CLEVELAND, OHIO

MR. HARLOW: Mr. Chairman, Conferees, Ladies and Gentlemen:

I am George Harlow, Director of the Lake Erie Program Office, Federal Water Pollution Control Administration, Cleveland, Ohio.

Mr. Chairman, do the conferees have copies of the Technical Committee report?

MR. STEIN: I believe they do.

MR. HARLOW: There is a pile of them here, in case they don't have one, because I will be reading from it, and they may wish to follow along with me.

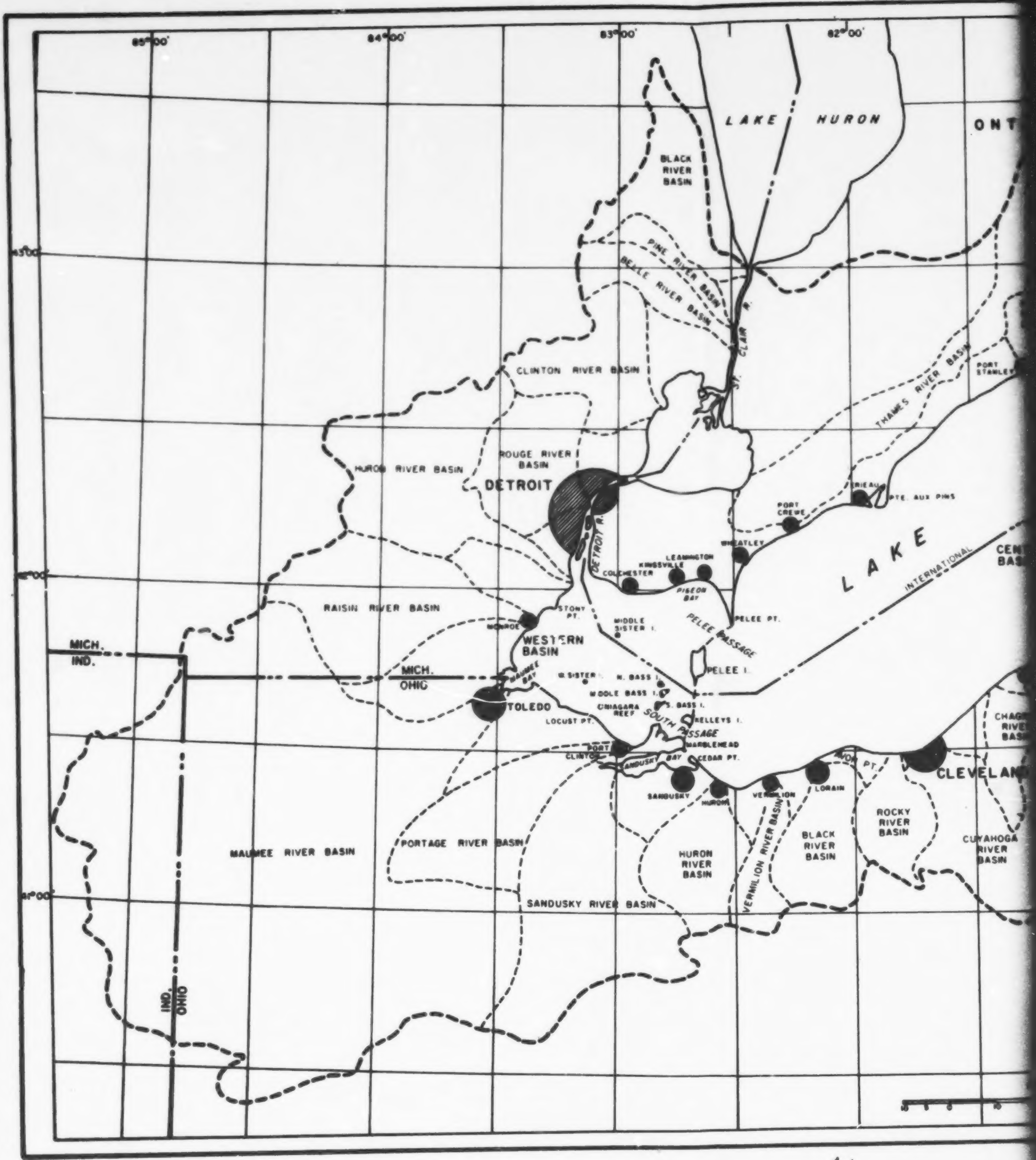
MR. STEIN: Are you going to read this whole report?

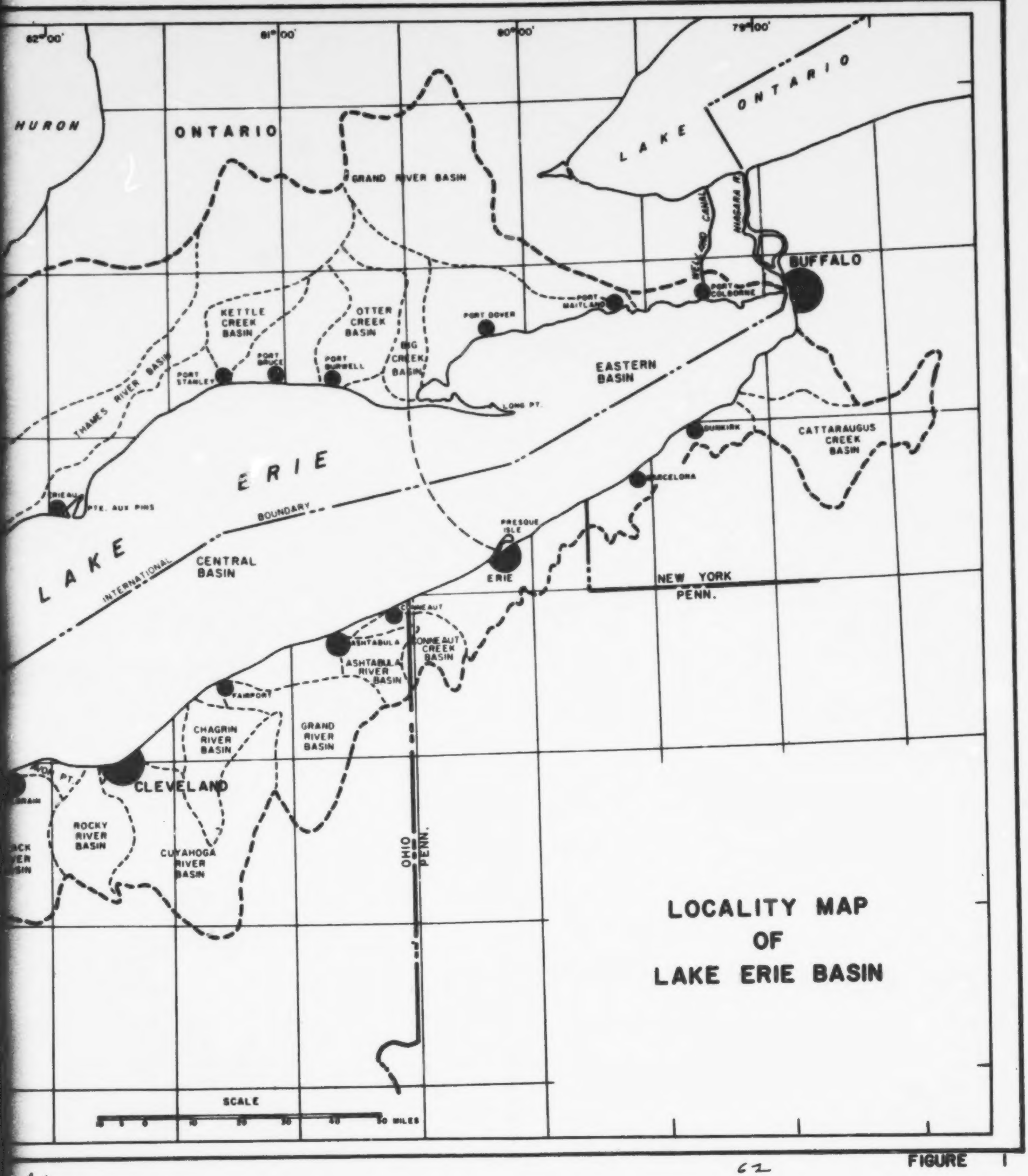
MR. HARLOW: No, but the conferees may wish to consider entering the entire report in the record.

MR. STEIN: Do you want to move that?

MR. POSTON: So moved.

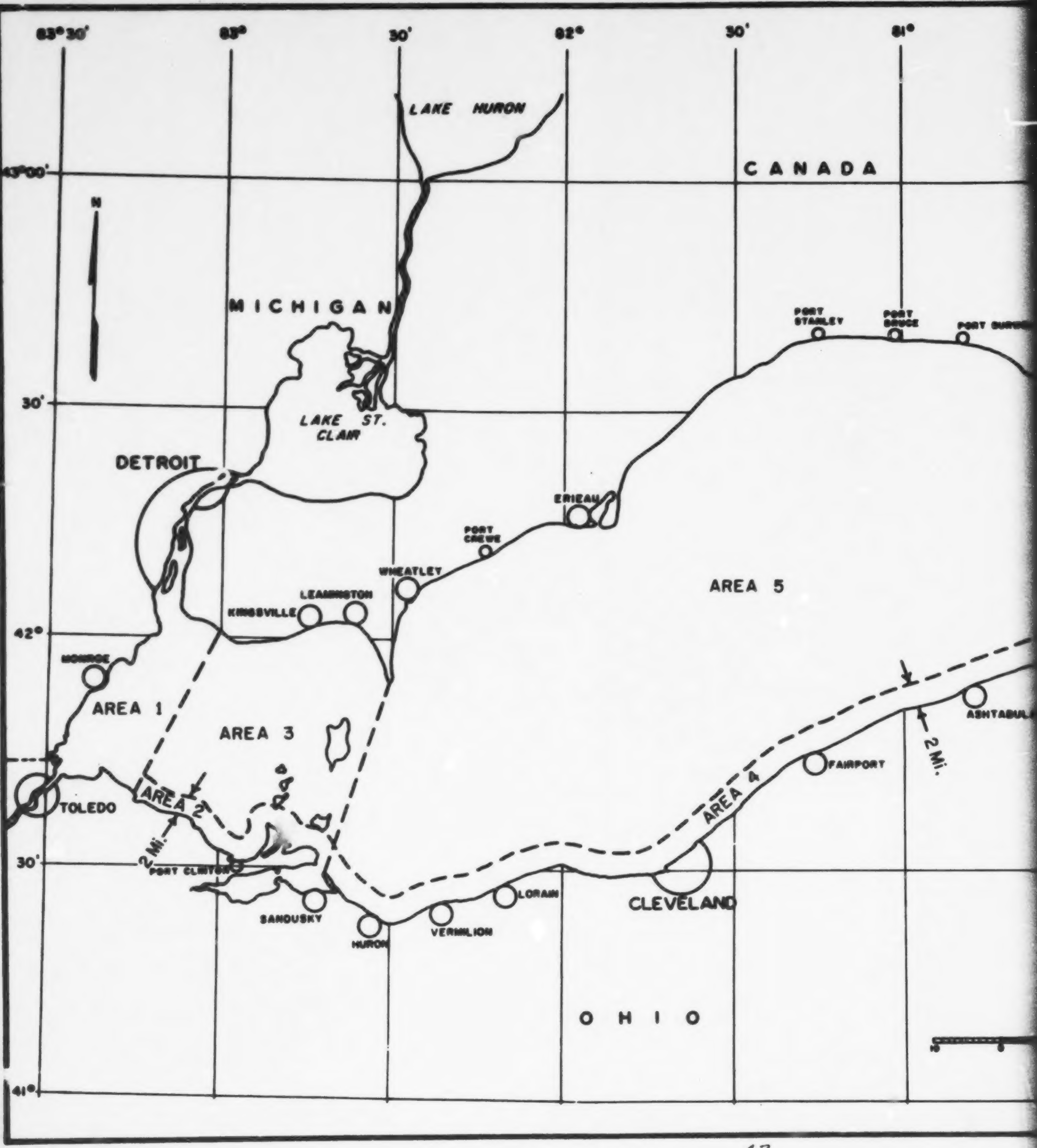
MR. STEIN: All right.

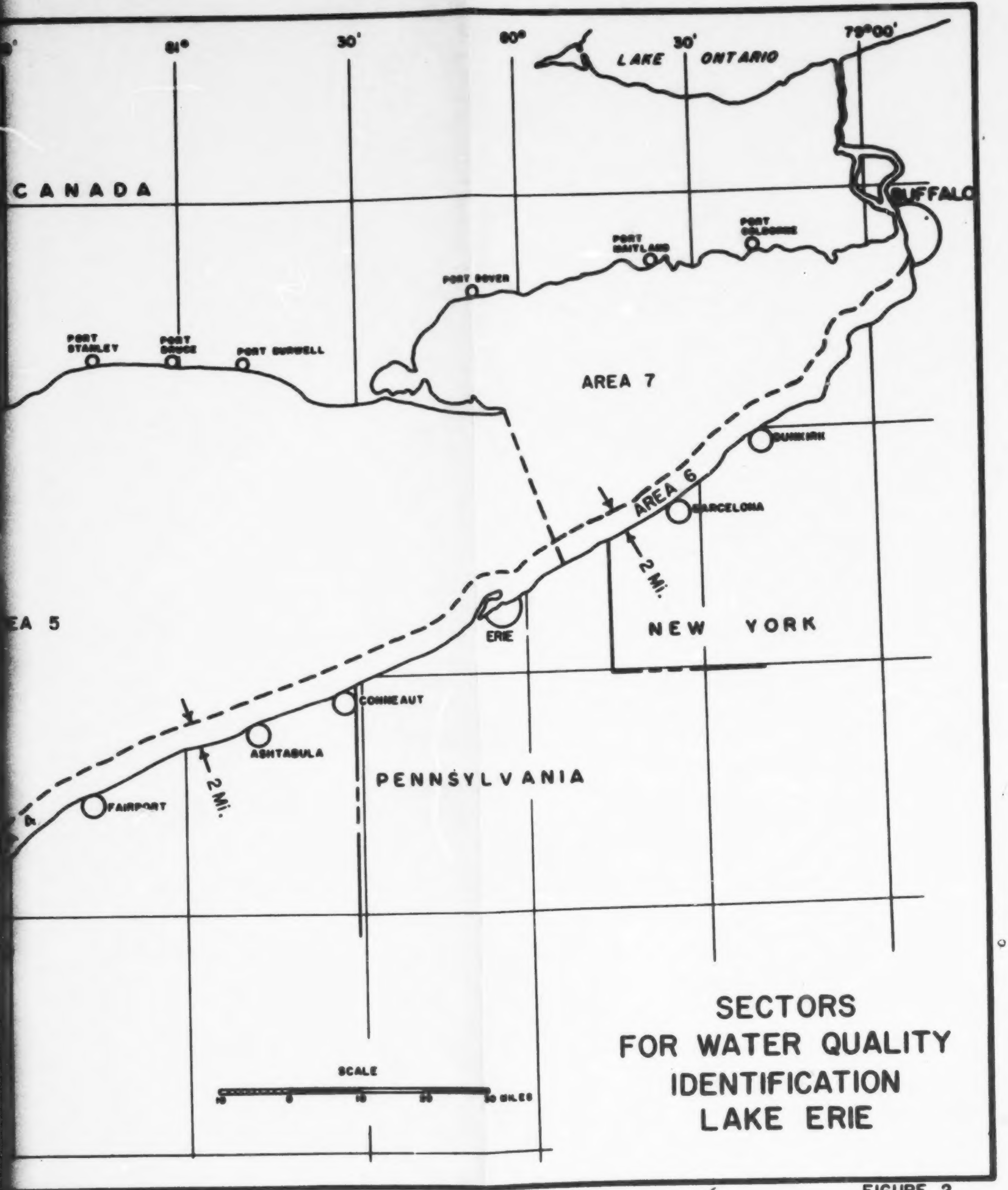

85°00'
84°00'
83°00'
82°00'
43°00'
42°00'
41°00'
LAKE HURON
ONT
BLACK RIVER BASIN
PINE RIVER BASIN
BELLE RIVER BASIN
ST. CLAIR R.
CLINTON RIVER BASIN
THAMES RIVER BASIN
PORT STANLEY
ROUGE RIVER BASIN
HURON RIVER BASIN
DETROIT
DETROIT R.
ERIEAU
PTE. AUX PINS
PORT CREWE
WHEATLEY
LEAMINGTON
KINGSVILLE
COLCHESTER
PIGEON BAY
LAKE
INTERNATIONAL
CENT BAS
RAISIN RIVER BASIN
STONY PT.
MONROE
MIDDLE SISTER I.
PELEE PT.
PELEE PASSAGE
WESTERN BASIN
PELEE I.
MICH. IND.
MICH. OHIO
MAUMEE BAY
TOLEDO
W. SISTER I.
N. BASS I.
MIDDLE BASS I.
NIAGARA REEF
S. BASS I.
SOUTH PASSAGE
LOCUST PT.
KELLEYS I.
MARBLEHEAD
PORT CLINTON
SANDUSKY BAY
CEDAR PT.
SANDUSKY
HURON
VERMILION
LORAIN
AVON PT.
CLEVELAND
CHAGR RIVE BAS
ROCKY RIVER BASIN
CUYAHOGA RIVER BASIN
BLACK RIVER BASIN
VERMILION RIVER BASIN
HURON RIVER BASIN
MAUMEE RIVER BASIN
PORTAGE RIVER BASIN
SANDUSKY RIVER BASIN
IND. OHIO
10 5 0 10


82°00'
81°00'
80°00'
79°00'
HURON
ONTARIO
LAKE ONTARIO
GRAND RIVER BASIN
WELLAND CANAL
NIAGARA R.
BUFFALO
PORT COLBORNE
PORT MAITLAND
PORT DOVER
KETTLE CREEK BASIN
OTTER CREEK BASIN
BIG CREEK BASIN
THAMES RIVER BASIN
PORT STANLEY
PORT BRUCE
PORT BURWELL
LONG PT.
EASTERN BASIN
DUNKIRK
CATTARAUGUS CREEK BASIN
BARCELONA
LAKE ERIE
RIEAU
PTE. AUX PINS
BOUNDARY
INTERNATIONAL
CENTRAL BASIN
PRESQUE ISLE
ERIE
NEW YORK
PENN.
CONNEAUT
ASHTABULA
CONNEAUT CREEK BASIN
ASHTABULA RIVER BASIN
FAIRPORT
CHAGRIN RIVER BASIN
GRAND RIVER BASIN
CLEVELAND
LORAIN
ROCKY RIVER BASIN
CUYAHOGA RIVER BASIN
OHIO
PENN.
SCALE
10 5 0 10 20 30 40 50 MILES

LOCALITY MAP
OF
LAKE ERIE BASIN

FIGURE 1


83°30'
83°
30'
82°
30'
81°
LAKE HURON
43°00'
CANADA
N
MICHIGAN
PORT STANLEY
PORT BRUCE
30'
LAKE ST. CLAIR
DETROIT
ERIEAU
PORT CREWE
WHEATLEY
AREA 5
LEAMINGTON
KINGSVILLE
42°
MONROE
AREA 1
AREA 3
ASHTABUL
2 Mi.
FAIRPORT
TOLEDO
AREA 2
AREA 4
2 Mi.
30'
PORT CLINTON
SANDUSKY
HURON
VERMILION
LORAIN
CLEVELAND
OHIO
10
0
41°


81°
30'
80°
30'
79°00'
LAKE ONTARIO
CANADA
BUFFALO
PORT COLBORNE
PORT MAITLAND
PORT DOVER
PORT STANLEY
PORT BRUCE
PORT BURWELL
AREA 7
DUNKIRK
AREA 6
BARCELONA
2 Mi.
EA 5
ERIE
NEW YORK
CONNEAUT
ASHTABULA
PENNSYLVANIA
2 Mi.
FAIRPORT
4
SCALE
10
0
10
20
30 MILES

SECTORS FOR WATER QUALITY IDENTIFICATION LAKE ERIE

FIGURE 2

Without objection, the whole report will be entered into the record as if read.

MR. HARLOW: Thank you.

INTRODUCTION

At the request of the Honorable James A. Rhodes, Governor of the State of Ohio, Secretary Anthony Celebreeze of the United States Department of Health, Education and Welfare, under authority granted in Section 8 of the Federal Water Pollution Control Act of 1961, called a conference on pollution of Lake Erie and its tributaries. The conference was held in two sessions, in Cleveland on August 3-5, 1965, and in Buffalo on August 10-12, 1965. The conferees were as follows:

Dr. B. A. Poole, Indiana
Mr. Loring Oeming, Michigan
Dr. E. W. Arnold, Ohio
Mr. George Eagle, Ohio
Mr. Fred Mohr, Ohio
Mr. Richard Boardman, Pennsylvania
Mr. Robert Hennigan, New York
Mr. H. W. Poston, Federal Government

The conference chairman was Mr. Murray Stein, Federal Water Pollution Control Administration (FWPCA), Washington, D. C.

After hearing a Federal report on pollution in the conference area, reports on pollution control activities in each of the five States, and statements by others, the conferees agreed unanimously on a summary containing conclusions and recommendations that was later issued by the Secretary of the Department of Health, Education and Welfare on November 12, 1965.

One of the summary recommendations stated:

> "The conferees will establish a Technical Committee as soon as possible which will evaluate water quality problems in Lake Erie relating to nutrients and make recommendations to the conferees within six months after the issuance of this Summary."

At a conferees' meeting in Cleveland on September 1, 1965, members of the technical committee were selected. On December 17, 1965, the conferees met with the designated committee members and the Lake Erie Enforcement Conference Technical Committee was formally established. The following members and their alternates were appointed:

State	Member	Alternates
Michigan	Carlos Fetterolf, Jr.	---
Indiana	Perry Miller	John Winters
Ohio	J. E. Richards	George Garrett
Pennsylvania	Walter Lyon	Daniel Bardarik Paul Heitzenrater
New York	Robert Hennigan	Donald Stevens

Mr. Grover Cook, FWPCA, was appointed Chairman of the committee, and served until January, 1967. From January, 1967 until the present Mr. George Harlow, FWPCA, has been Chairman of the committee. Mr. Frank Hall, FWPCA, is Secretary to the committee.

At the September 1, 1965 meeting, the conferees asked the committee to investigate the following aspects of Lake Erie problems:

"(1) Determine the situation, past and present, in Lake Erie with regard to nutrient levels and the related consequences. Also determine how the existing situation would be modified by various pollution control methods.

(2) Determine the nutrient levels or concentrations which constitute interstate pollution of Lake Erie.

(3) Determine the nutrient levels or concentrations

which should be established as water quality objectives in various parts of Lake Erie.

(4) Determine the sources of nutrients entering Lake Erie and the percentages originating from: detergents; other municipal wastes; industrial wastes; and agricultural land use.

(5) Determine the nutrient balance of Lake Erie.

(6) Identify the various nutrients affecting Lake Erie water quality and determine which are susceptible to control."

On June 22, 1966, a third meeting of the Lake Erie Enforcement Conferees was held in Cleveland, Ohio at which Chairman Stein added a seventh instruction to those listed above:

(7) Identify other lake problems and explore ways of dealing with them.

At that third meeting, the conferees, presided over by Secretary of the Interior Stewart Udall, were presented with a report by the Technical Committee which had been formed. The conferees did not consider the report to be a consensus of all Technical Committee members. The Technical Committee was directed to continue its deliberations and revise the Interim Report to reflect a consensus.

It was decided by Secretary Udall and the conferees that it should be called an Interim Report.

The Technical Committee reviewed and revised the June 22, 1966 Interim Report to reflect a consensus of all committee members and submitted it to the conferees. The report was retitled "Interim Report of the Lake Erie Enforcement Conference Technical Committee, June, 1966 (Revised, November, 1966)."

This March, 1967 from which I am reading report expands upon the revised Interim Report to include discussion, conclusions and recommendations regarding each of the sevel instructions. It reflects the consensus of all the committee members.

The Lake Erie Enforcement Conference Technical Committee wishes to acknowledge the advice and invaluable information provided to the committee by many individuals. The following persons have graciously given of their time to attend and contribute to meetings of the committee or to otherwise provide information:

Dr. Alfred M. Beeton, University of Wisconsin, Milwaukee, Wisconsin

Mr. Kenneth Biglane, FWPCA, Washington, D. C.

Mr. Russell Brant, Ohio Department of Natural Resources, Columbus, Ohio

G. L. Harlow

Mr. Ted Brenner, Soap and Detergent Association, New York, N. Y.

Dr. N. Wilson Britt, Ohio State University, Columbus, Ohio

Mr. Charles Bueltman, Soap and Detergent Association, New York, N. Y.

Dr. Richard Engelbrecht, University of Illinois, Urbana, Illinois

Mr. Frederick Fuller, FWPCA, Chicago, Illinois

Mr. Harold Hall, FWPCA, Chicago, Illinois

Mr. Robert Hartley, FWPCA, Cleveland, Ohio

Mr. C. E. Herdendorf, Ohio Department of Natural Resources, Sandusky, Ohio

Dr. Matthew Hohn, Central Michigan University, Mt. Pleasant, Michigan

Mr. G. LaMar Hubbs, FWPCA, Cleveland, Ohio

Mr. Conrad Kleveno, FWPCA, Cleveland, Ohio

Dr. Edward Martin, FWPCA, Washington, D. C.

Mr. Stephen Megregian, FWPCA, Chicago, Illinois

Mr. John Neil, Ontario Water Resources Commission, Toronto, Canada

Mr. C. Ray Ownbey, FWPCA, Chicago, Illinois

Dr. Charles Priesing, FWPCA, Ada, Oklahoma

G. L. Harlow

Dr. Gerard Rohlich, University of Wisconsin, Madison, Wisconsin

Dr. Stanford Smith, U. S. Bureau of Commercial Fisheries, Ann Arbor, Michigan

Dr. Jacob Verduin, Eastern Illinois University, Charleston, Illinois

Mr. David Wagner, FWPCA, Chicago, Illinois

Mr. John Wirts, Cleveland Easterly Pollution Control Center, Cleveland, Ohio

The committee is especially grateful to Mr. John Carr of the Bureau of Commercial Fisheries, U. S. Department of the Interior, and Mr. Al Harris of the Ontario Water Resources Commission, who participated in the work of the committee and assisted in the preparation of this report.

DISCUSSION OF FINDINGS

Instruction 1(A) "Determine the situation, past and present, in Lake Erie with regard to nutrient levels and the related consequences."

Recent environmental changes in Lake Erie were reported by specialists in many water-oriented disciplines.

Chemical Conditions. Records from many sources over the past 50 years show an increase in chlorides from 8 milligrams per liter (mg/l) to 26 mg/l, and an increase in sulfates from 13 mg/l to 23 mg/l. Good long-term records for phosphorus are not available, but recent information indicates that there has been a substantial increase in phosphorus inputs and an increase in concentration in the lake. Most early limnologists considered that nitrogen was the limiting nutrient for algal growth. Therefore, tests for phosphorus were not common, and when phosphorus analyses were made, a variety of techniques and reporting procedures were used. (Appendixes B and C contain a suggested procedure for reporting and testing.)

During summer thermal stratification, dissolved oxygen (DO) is substantially reduced in the bottom waters of a large area in the central basin. This was first reported in 1929 and has been observed many times since. However, the DO now reaches zero and the area where low DO occurs is widening. This DO deficit results largely from the decomposition of algae and may be explained as follows:

a. Algae are produced in excessive amounts in the western basin and along the shoreline of the central and eastern basins as a manifestation of plant nutrient concentrations.

b. The algae cells drift around the lake and eventually settle to the bottom. During this settling process, oxygen is consumed by decay of dead cells.

c. Decaying cells accumulate in the bottom muds and exert oxygen demand as decomposition continues.

d. During summer periods of thermal stratification, when the bottom layer of water is isolated from the oxygen-rich upper layer, the available oxygen in the lower layer may be used up by the decay process.

e. The rate of consumption is greatly intensified when the organically enriched sediments are stirred into suspension.

The theoretical relationship between phosphorus inputs, organic carbon produced by biological processes, and DO depletion was presented to the committee.

Physical Conditions. Records of lake levels have been kept for over a hundred years and fluctuations of several feet are well known. When the lake is high, shore erosion occurs. This has contributed to nutrient increases in the lake. When lake levels are low, as in the early sixties, a larger shoal area is affected by sunlight and a larger crop of Cladophora (attached algae) has been observed.

Harbor and channel modifications have changed current pattern in localized areas and have increased silt inputs. The dumping of dredged material from these operations has changed the composition of the lake bottom and has increased inputs of nutrients.

Lake currents are mostly the products of winds. At four feet above the lake bottom, current velocities as high as 2.0 feet per second have been recorded. A strong wind will induce thorough mixing more than 30 feet deep. Strong winds also produce an oscillation of the thermocline that results in mixing of the bottom waters, but without intermixing of the upper and lower water layers. This lack of intermixing is significant in that the oxygen-rich water of the upper layer (epilimnion) does not replenish the depleted oxygen supply in the lower layer (hypolimnion), and oxygen demanding material and nutrients do not leave the bottom waters during periods of thermal stratification.

Another physical characteristic that bears upon the overall problem is water temperature. Records show, using 10-year moving means, that there has been a rise of 2° F since 1918. The warming trend of the lake follows that of the climate.

Algae. Both the microscopic suspended algae called phytoplankton, or planktonic algae, and the filamentous algae that grow attached to firm substrata are responsible for nuisance conditions in Lake Erie. Of the two types, filamentous Cladophora has been troublesome for a longer time. The beaches on Kelleys Island have been littered with Cladophora for at least 30 years.

Chemical methods of Cladophora control have not been too successful. To be effective, the chemicals should be applied during periods of calm in the early part of the growing season. By present standards, chemical control is expensive, especially when used for large areas. It is estimated that for effective control, at least 350 square miles of Lake Erie would have to be treated.

Lake-wide information on phytoplankton is rather sparse. However, there are good data on samples taken in Cleveland since 1929 and in the South Bass Island area over the past few years. According to David (1966) these records indicate three main changes: 1. A gradual increase in the total quantity of phytoplankton has occurred. The average increase between 1927 and 1964 amounted to 44.3 cells/ml/yr and from 1956 to 1964 the increase was 122.0 cells/ml/yr; 2. There has been a change from typical, relatively brief vernal and autumnal phytoplankton pulses every year to pulses that are not only much more massive, but also more extensive. This has resulted in complete obliteration of the winter minimum and a considerable reduction of the length of the summer minimum; 3. There have been important changes of dominant algal genera. In 1929, the diatoms Fragilaria, Asterionella, and others that are common in Lakes Superior, Huron, and Michigan were predominant. Today, diatoms such as Stephanodiscus and Cyclotella, typical of enriched lakes, are the more abundant kinds. Dense blooms of highly undesirable blue-green algae have been observed in the area of the lake west of Cleveland. These blooms typically occur in eutrophic lakes and are rare in lakes like Superior and Huron.

Bottom Dwelling Animals. Prior to 1953, burrowing mayflies were the dominant bottom-dwelling animals in the western basin. In September 1953, this basin became thermally stratified, dissolved oxygen was depleted in the lower layer of water, and a catastrophic die-off of mayflies took place. The overall occurrence of these important fish food organisms has steadily declined. They have been almost completely replaced by sludgeworms and midge larvae. Major factors in the decline of the mayflies have been low DO and change in composition and distribution of the bottom sediments.

Fishes. Dramatic changes have occurred in the Lake Erie fishery since 1920. Although Lake Erie remains the most productive of all the Great Lakes, the catch is of poorer quality than it used to be. Yellow perch are still abundant. Blue pike have disappeared and walleyes, whitefish, and herring are scarce. Low DO that occurs in the hypolimnion of the central basin creates an unfavorable habitat for both fish and the organisms upon which they feed.

Conditions must be made suitable for the more desirable fish and aquatic organisms during all stages of their life cycle. Certain adult fish spawn on reefs and gravel areas. However, heavy wave action often washes the eggs into the degraded bottom muds prior to hatching. The oxygen deficient sediments and overlying waters in many parts of the lake are entirely unsuitable for the successful completion of their life cycles. The percentage of eggs that hatch is greatly reduced and those young fish which at times develop from the eggs die rapidly and the propagation of the more desirable species ceases. These are subsequently replaced in time by species which are more tolerant to degraded environmental conditions. Total fish productivity is not necessarily impaired, but the percentage of desirable species is greatly reduced in favor of the less desirable species. The ultimate result would be a highly productive lake full of coarse fish.

Instruction 1(B) "Also determine how the existing situation would be modified by various pollution control methods."

The existing situation will be modified by the elimination or reduction of organic material, nutrients, and silts from municipal, industrial, and agricultural sources. Secondary or equivalent treatment must be provided for all wastes. Treatment processes and techniques must be developed for the substantial removal of phosphorus from sewage and industrial wastes. At several locations in the southwestern United States, modifications of activated sludge type of treatment have increased the removal of phosphorus. Additional demonstration projects are needed to prove the applicability of these modifications to activated sludge plants in the Lake Erie Basin. Development of new processes should be encouraged for use in augmenting and improving those modifications already under study for activated sludge-type plants. Additional modifications must be developed and employed to effect high phosphorus removals in other type plants.

Instruction II. "Determine the nutrient levels or concentrations which constitute interstate pollution of Lake Erie."

Instruction III. "Determine the nutrient levels or concentrations which should be established as water quality objectives in various parts of Lake Erie."

It was the opinion of the committee members that Instructions II and III should be considered jointly and the following statements are made accordingly.

A determination was made of existing concentrations of total phosphorus and soluble phosphorus in Lake Erie. The following tables present data for seven areas of the lake and for the major harbors (see Figure 2 and Tables 1 and 2).

It was the finding of the conferees, and the members of the committee agree, that Lake Erie is over-enriched. The highest nutrient concentrations and excessive crops of algae are found in the western basin and in the shoreline area. It is the committee's opinion that pollution from nutrients is occurring at these present concentrations. Total phosphorus ranged from 0.015 mg/l in mid-lake waters of the central and eastern basins to 0.090 mg/l in the western basin and along the Ohio shoreline. Soluble phosphorus ranged from 0.008 mg/l to 0.050 mg/l in the same areas of the lake. Inorganic nitrogen varied from average values of 0.25 mg/l to 0.75 mg/l. For comparison, in southern Lake Huron where eutrophication is not a problem, 50 analyses for total PO_4-P were reported less than 0.008 mg/l and 14 additional samples averaged 0.03 mg/l; 54 analyses for soluble PO_4-P were reported less than 0.008 mg/l and 10 additional samples averaged 0.03 mg/l. Inorganic nitrogen in southern Lake Huron averaged 0.25 mg/l. The concentrations of nitrogen and phosphorus in the central and eastern basins of Lake Erie are not much greater than the concentrations in Lake Huron.

The only information available on levels of phosphorus and nitrogen that has provided a guide for the development of suitable criteria necessary to restore Lake Erie water quality was that of Sawyer (1954) in his classical Madison, Wisconsin lake studies. He found that when the concentration "of inorganic nitrogen and [soluble] phosphorus exceed 0.30 ppm and 0.01 ppm respectively, at the start of the active growing season (time of spring turnover in northern climates), a season with nuisance blooms [of algae] would follow."

Other experts that met with the committee could not provide information to support or dispute these figures and therefore did not disagree with Sawyer's values. Sawyer's values compare very closely with water quality in southern Lake Huron and mid Lake Erie where prolific growths do not occur. Based on this information and the available chemical and biological data, the committee determined that the following concentrations of nutrients should be established as water quality objectives in various parts of Lake Erie:

Location	Total PO_4-P	Sol PO_4-P	Inorganic N
(See Fig. 2)	mg/l	mg/l	mg/l
Areas 1, 2, 3 & 4	0.025	0.010	0.3
Areas 5, 6 & 7	0.015	0.007	0.3

The committee further determined that concentrations of nutrients greater than the values in the above table constitute pollution of Lake Erie.

The necessary reduction of phosphorus loads required to meet the proposed criteria is shown in Appendix A.

TABLE 1

PHOSPHORUS CONCENTRATIONS IN LAKE ERIE

	Total PO_4-P, mg/l				Sol. PO_4-P, mg/l			
Area	#Samples	Max.	Min.	Avg.	#Samples	Max.	Min.	Avg.
1	128	0.67	0.013	0.09	320	0.57	0	0.05
2				*	13	0.08	0	0.03
3				*	57	0.07	0	0.02
4				*	874	0.65	0	0.04
5				*	418	0.20	0	0.01
6				*	30	0.61	0	0.01
7				*	174	0.03	0	0.01

*No data, but using the ratio of total to soluble phosphates found for the Detroit River mouth and Maumee Bay, it is assumed for other areas of the lake that the total phosphates would be approximately double the soluble values.

TABLE 2

PHOSPHORUS CONCENTRATIONS IN HARBOR AREAS

		Tot. PO_4-P, mg/l			Sol. PO_4-P, mg/l		
Area	**#Samples**	**Max.**	**Min.**	**Avg.**	**Max.**	**Min.**	**Avg.**
Detroit R., Mouth	38	0.67	0.013	0.13	0.37	0.013	0.08
Maumee Bay	13	0.30	0.013	0.11	0.3	0.07	0.05
Sandusky, O.	56			*	0.80	0	0.08
Lorain, O.	54			*	0.15	0	0.02
Cleveland, O.	98			*	0.68	0	0.06
Fairport, O.	99			*	0.31	0	0.02
Ashatabula, O.	66			*	0.66	0	0.05
Erie, Pa.	119			*	0.46	0	0.09

*No data, but using the ratio of total to soluble phosphates found for the Detroit River mouth and Maumee Bay, it is assumed for other areas of the lake that the total phosphates would be approximately double the soluble values.

Instruction IV. "Determine the sources of nutrients entering Lake Erie, and the percentages originating from: detergents, other municipal wastes, industrial wastes, and agricaultural land use."

Phosphates in detergents. The average discharge of total phosphorus (P) in domestic wastes on a per capita per year basis is 3.5 pounds (Sawyer, 1965). One pound is from human excreta and 2.5 pounds are from detergents. In the Lake Erie basin, the phosphorus contribution from municipal wastes is 80 percent, which can be broken down by sources as human excreta, 22 percent; detergents, 53 percent; and other sources, 5 percent.

Representatives of the soap and detergent industry informed the Technical Committee that an acceptable substitute for phosphate was not presently available. The importance of polyphosphates lies in synergistic effects obtained when used with surfactants. Significant loss of cleaning power results when substitutes are used.

Some of the important functions of phosphates in detergents are to provide alkalinity, increase dirt and grease removing capacity, reduce redeposition of dirt, soften the water, limit scum formation, and prevent fiber staining. Phosphate content varies from a high of 57 percent in heavy-duty laundry powders to less than 10 percent in light-duty liquids. Phosphates are also present in almost all soaps.

The soap and detergent representatives acknowledged that phosphates affect the nutrient balance of waters, but believed the exact role in algal growth and eutrophication had not been clearly defined. They pointed out that in 1958, 70 percent of the elemental phosphorus sold went into fertilizers and 13 percent as built detergents.

Phosphorus from municipal discharges. Direct discharges of phosphorus to Lake Erie from municipal sewage treatment plants constitute about 80 percent of the total input from all sources. No measured values are available for urban runoff in the Lake Erie basin, but a study by Weibel, Anderson, and Woodward (1964) revealed that an urban acre yields 2.5 pounds of soluble phosphate (PO_4) per year. This would comprise a relatively small percentage of the total inputs.

Phosphorus from rural runoff. It has been demonstrated that municipal and industrial phosphorus inputs constitute about 85 percent of the total. The remaining 15 percent is attributable to rural runoff. This was verified by applying values established by Englebrecht and Morgan (1961) for an area in Illinois to the Lake Erie drainage basin.

Instruction V. "Determine the nutrient balance of Lake Erie.

Phosphate balance. The concentration of total PO_4-P leaving Lake Huron was shown on Page 80. This results in a discharge of total PO_4-P from Lake Huron of less than 20,000 lbs. per day. That amount of total phosphate leaving the Detroit River to enter Lake Erie is approximately

86,000 lbs/day, resulting in a pickup in the Detroit-Windsor metropolitan area of 66,000 lbs/day.

There is a change in that sentence, so that it reads as follows:

"That amount of total phosphate leaving the Detroit River to enter Lake Erie is approximately 86,000 lbs/day, resulting in a pick-up in the waters of the Great Lakes between Lake Huron and Lake Erie of 66,000 lbs/day."

I might ask Mr. Oeming if he thinks that sufficiently explains the situation?

MR. OEMING: Yes.

MR. HARLOW: All right.

The discharges of phosphate by areas is summarized in Table 3.

TABLE 3

DISCHARGE OF PHOSPHATES TO LAKE BY AREAS

Area	Total Phosphate-P Lbs/day
Michigan Ontario	
Discharge from Lake Huron	<20 000
Detroit-Windsor metropolitan area	66,000
Michigan tributaries to Lake Erie	2,000
Ohio	
Municipal & industrial (shoreline)	28,000
Ohio tributaries	20,000
Pennsylvania & New York	6,000
Ontario, other sources	10,000
Sum of major known sources	152,000
Discharged at Niagara River	50,000

Excluding the discharge from Lake Huron, of the 132,000 lbs/day of total phosphates expressed as P discharged to Lake Erie, approximately 112,000 lbs. come from municipal and industrial wastes, and 20,000 lbs. from rural land runoff. Of the municipal contribution, 70,000 lbs/day come from detergents, 30,000 from human excreta, 6,000 from urban land runoff, and 6,000 from industrial wastes. These totals are summarized in Table 4.

TABLE 4

TOTAL PO_4 INPUTS TO LAKE ERIE BY SOURCES

Source	PO_4-P Lbs/day
Lake Huron	$<$20,000
Rural land runoff	20,000
Municipal	
Detergents	70,000
Human excreta	30,000
Urban land runoff	6,000
Industrial (direct discharge	6,000
TOTAL	152,000

Since only 50,000 lbs/ day are discharged via the Niagara River, Lake Erie retains 102,000 lbs/day. Part of this amount is utilized by algae, small animals, and fish, part becomes locked in the sediments, and part is recycled and reused by the biomass.

Since the contribution of total PO_4-P from domestic wastes is about 3.5 lbs/cap/yr and 11 million persons live in the Lake Erie basin below Lake Huron, the annual contribution from municipal sources is 38,500,000 pounds.

Instruction VI. "Identify the various nutrients affecting Lake Erie water quality and determine which are susceptible to control."

Specialists who met with the committee mentioned nutrient substances such as nitrogen, potassium, vitamins, and carbon, but under present knowledge, phosphorus is the most important element and the one most susceptible to control. Nitrogen occurs in nature and can be fixed by certain bacteria. Potassium is sufficiently abundant in natural waters, and the role of vitamins and other growth substances is not well defined.

Instruction VII. "Identify other Lake Erie problems and explore ways of dealing with them."

Many other nutrient elements are recognized as requirements for algal production and growth, including many trace elements. Information is lacking as to the role of the trace elements and the possibilities for removal.

The committee recognized a need, in the phosphorus problem, of determining more exact figures on the contribution from various sources such as runoff from soil, animal wastes, and algae decomposition. It was brought to the attention of the committee that bottom sediment storage may contribute to the phosphorus supply of the lake water. However, available data indicate that the hypolimnetic buildup of phosphorus is reprecipitated at fall turnover of the lake water.

The committee has become aware of many of the problems which will be involved in removing a very high percentage of the phosphorus contribution to Lake Erie. It is recognized that percentage of phosphate removal must be increased with population growth and economic expansion and that ultimate disposal of nutrients will become increasingly more important in order to prevent their return to the lake.

Other problems of pollution are also recognized by the committee, such as increasing dissolved inorganic substances throughout the lake; bacterial, color, suspended solids, and floating solids problems along the shore; and special local problems caused by large industrial and municipal waste discharges, where, because of volume, treatment must be highly refined.

The following are present or potential problems in Lake Erie:

Toxic effect of algae
Botulism in waterfowl
Dumping of dredgings
Exploration for oil and gas
Taste and odor problems in drinking water
Short filter runs
Pollution by vessels

G. L. Harlow

Uniformity of regulations on marine toilets

Uniformity of fish laws

Effects of lake levels on Cladophora

CONCLUSIONS

1. The major pollution problem in Lake Erie results directly or indirectly from excess algae. These growths are stimulated by nutrients resulting from man's activities.

2. Silts containing nutrients are being contributed to the lake from dredging operations, urban and agricultural runoff, and shore erosion.

3. Wind-induced currents transport nutrients and silt over wide areas of the lake.

4. Reliable long-term records for phosphorus and nitrogen are not available for Lake Erie waters.

5. The one nutrient most susceptible to control is phosphorus.

6. Phosphorus entering the lake originates from municipal wastes. rural land runoff, and industrial wastes. About 80 percent is attributable to municipal wastes.

7. About 66 percent of the phosphorus in municipal wastes if from detergents.

8. Earlier data on phosphorus are difficult to

interpret due to lack of information on the analytical procedure used and the method of expressing the results.

9. Water quality problems occur when the concentrations of soluble phosphorus and inorganic nitrogen exceed 0.01 mg/l and 0.30 mg/l respectively.

10. Water quality objectives should be established that will prevent nuisance algae conditions.

11. Even if water quality objectives are met, a reduction in frequency and intensity of algal nuisance conditions will be gradual.

12. Water quality objectives for Lake Erie should be established so that present high quality water will be preserved and the waters will be improved in the areas where nuisance conditions now exist.

13. A rise in air and water temperatures has contributed to changes in the aquatic environment.

14. Efforts to limit the growth of the filamentous alga Cladophora by the application of chemicals in the lake have been successful only on a small scale. Experience has demonstrated it is not feasible to apply these techniques to large areas. Chemical control of plankton algae is also impractical.

15. The quality of the Lake Erie fishery has declined. The major factor in the decline of the more

desirable species has been the destruction of suitable environment within which they could successfully complete their life cycle and be maintained in abundance.

RECOMMENDATIONS

Water Quality Criteria

1. The following level of phosphate and inorganic nitrogen expressed as P and N should be established as the water quality objective for Lake Erie:

Location (See Fig. 2)	Total PO_4-P mg/l	Sol PO_4-P mg/l	Inorganic N mg/l
Areas 1, 2, 3 & 4	0.025	0.010	0.3
Areas 5, 6 & 7	0.015	0.007	0.3

2. The following points of measurement should be established to assess P and N water quality at locations in Recommendation 1:

Location	Points of Measurement
Areas 1, 2, 3 & 4 (See Fig. 2)	Range Pte. Mouillee to Detroit River Light (2,000, 8,000 and 13,000 feet offshore), average of these three stations Toledo Harbor Lighthouse

Location	**Points of Measurement**
	Raisin River channel buoy No. B1 South Bass Island and Pelee Passage lights Water intakes of: Toledo, Ohio Port Clinton, Ohio Sandusky, Ohio Vermilion, Ohio Lorain, Ohio Cleveland Electric Illumination Co. at Eastlake, Ohio Industrial Rayon Corp. at Fairport, Ohio Intake East 2 miles of mouth of Ashtabula, Ohio Conneaut, Ohio
Areas 5, 6 & 7 (See Fig. 2)	Water intake cribs of: Cleveland, Ohio Buffalo, New York Erie, Pennsylvania Any point in central or eastern basin 2 miles from shore or beyond

3. These levels proposed for nutrient criteria should not be exceeded in more than 20 percent of the samples taken in any one year. To assess the nutrient

water quality, samples should be taken at least once per month. Sample collection should be 3 feet below surface for mid-lake stations and inside the water plant from the raw water tap for the water intake stations.

Nutrient Control

4. A suitable substitute should be found to replace phosphates in detergents. The soap and detergent industry and the Federal Government should promote and encourage the research and development of a suitable substitute.

5. Demonstration projects to remove phosphorus by modification of the activated sludge process should be established in the Lake Erie basin.

6. New processes must be developed and employed to effect high phosphorus removal in other plant types.

7. Phosphates removed by treatment must not be returned to a water course.

8. The Department of Agriculture, State agricultural agencies, and local conservancy districts should initiate programs to control runoff from agricultural lands.

9. The USGS, the Corps of Engineers, and various State agencies should strengthen their programs to reduce

further soil erosion in the Lake Erie basin.

10. The practice of dumping in Lake Erie pollutional materials dredged from rivers and harbors should be stopped.

Terminology, Analytical Methods, and Data Reporting

11. Concentrations of phosphates, both soluble and total, in surface waters should be expressed as elemental phosphorus (P).

12. Samples should be analyzed for total phosphorus and soluble phosphorus using the stannous chloride method, including persulfate and extraction. (This method is attached in Appendix C.) Where a particular laboratory departs from the method outlined in the appendix it should be clearly indicated and documented that in all concentrations encountered in surface water and with interfering substances usually encountered that the method yield results within the limits of reproducibility of the recommended method.

13. Sewage treatment plants should regularly test for total and soluble phosphorus under direction of the State water pollution control agency and results should be reported to the State agency.

Recommended Studies

14. Research should be encouraged that would explore procedures for recovering phosphorus.

15. The Bureau of Commercial Fisheries, the FWPCA the States, and other agencies should increase the tempo of research programs in Lake Erie to more clearly define all the factors adversely affecting the fishery, municipal water supplies and recreational uses.

16. Research should also be directed toward the following problems:

Toxic effects of algae
Botulism in waterfowl
Exploration of oil and gas
Taste and odor problems in drinking water
Short filter runs at water plants
Pollution by vessels
Uniformity of regulations on marine toilets
Uniformity of fish laws
Effect of lake levels on *Cladophora*

REFERENCES

1. Davis, C. C., 1964. Biological Research in the Central Basin of Lake Erie. Proceedings, 9th Conference on Great Lakes Research, University of Michigan, Great Lakes Research Division Publication 15: 18-25.
2. Engelbrecht, R. S. and J. J. Morgan, 1961. Land Drainage as a Source of Phosphorus in Illinois Surface Waters. Transaction of the 1960 Seminar on Algae and Metropolitan Wastes. U. S. Public Health Service, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio
3. Sawyer, C. N., 1954. Factors Involved in Disposal of Sewage Effluents to Lakes. Sewage and Industrial wastes, 26: 317-328.
4. Sawyer, C. N., 1965. Problems of Phosphorus in Water Supplies. American Water Works Association, 57: 1431-1439.
5. Weibel, S. R, R. J. Anderson, and R. L. Woodward, 1964. Urban Runoff as a Factor in Stream Pollution. Journal, Water Pollution Control Federation, 36(7): 914-924.

APPENDIX A

REDUCTION IN PHOSPHORUS LOAD NECESSARY TO MEET PROPOSED CRITERIA

The following method of calculation based on PO_4-P loads and apportioned flow of the Detroit River plus that from U. S. tributaries is suggested. In apportioning the Detroit River, it is suggested that 40 percent or 74,000 cfs be assigned to carry Michigan loads into the western basin and along the southern shore of the lake. Another 40 percent be assigned to carry the load from the upper lakes to mid Lake Erie and the remaining 20 percent or 36,000 cfs to carry waste loads from Canada along the Canadian shoreline.

With the above assumption and assuming the actual contribution from Lake Huron equals 10,000 lbs/day, the necessary waste reduction of U. S. loads would be calculated as follows:

U. S. Loads		lbs/day total P
Upper lakes 0.40 x 10,000[1]	=	4,000 (b)
Michigan (est.)		55,000

[1] On Pages 86 and 87 of the report, this figure is reported as less than 20,000 lbs/day. For the purpose of making this calculation, the actual discharge is assumed to be 10,000 lbs/day

G. L. Harlow

U. S. Loads		lbs/day total P	
Ohio tribs. & direct discharge		48,000	
Pa. & N. Y.		6,000	
	Total	113,000	(a)

Flows (cfs) = 0.40 x 185,000 + 12,000 from Ohio + 3,000 (est.) from Pa. & N. Y. = 89,000 cfs.

Total PO_4 permissible load = 89,000 cfs x 5.4 x 0.025 mg/l

= 12,000 lbs/day (c)

(0.025 is the suggested criteria for total P and 5.4 is a factor converting cfs and mg/l to lbs/day).

Required maximum reduction of U. S. loads

$$= \frac{a - c}{a - b}$$

$$= \frac{113{,}000 - 12{,}000}{113{,}000 - 4{,}000} = 92.5 \text{ percent}$$

The approximate distribution of these U. S. loads (lbs/day) and percent reductions would be as follows:

	Present Load	Permissible Load	% Reduction
Municipal	90,500	4,520	95
Industrial	5,650	565	90
Runoff	17,000	6,800	60
		11,885	

The percent reduction indicated would be required to maintain the criteria for Total P at 0.025 mg/l.

Since 66 percent of the PO_4 in municipal wastes is from detergents, if the PO_4 in detergents could be eliminated, the remaining PO_4 in municipal wastes would have to be treated by 85 percent.

APPENDIX B

PHOSPHATE REPORTING

The more common methods for expressing the results of chemical determinations for phosphorus vary as to the form of phosphorus used. The most common methods express the results as P_2O_5 (Phosphorus pentoxide), PO_4 (phosphate) and P (phosphorus). The relationship between these methods of expression are:

$$1 \text{ mg/l } P = 2.29 \text{ mg/l } P_2O_5 = 3.06 \text{ mg/l } PO_4$$

$$1 \text{ mg/l } PO_4 = 0.75 \text{ mg/l } P_2O_5 = 0.33 \text{ mg/l } P$$

$$1 \text{ mg/l } P_2O_5 = 1.34 \text{ mg/l } PO_4 = 0.44 \text{ mg/l } P$$

The Committee decided that results or criteria should be reported for total phosphorus as P and soluble phosphorus as P to be consistent with Sawyer and most of today's investigators.

G. L. Harlow

APPENDIX C

ANALYTICAL METHOD FOR THE MEASUREMENT OF TOTAL PHOSPHATE

EXPRESSED AS TOTAL PHOSPHORUS

This method is according to 12 ed. Standard Methods, Method C, p. 236 with some modifications.

1. General Discussion

1.1 Principle: The total-phosphate content of the sample includes all the soluble orthophosphate and polyphosphates, and insoluble phosphates precipitated during storage. If any insoluble phosphates are present, for practical purposes they are assumed to be insoluble orthophosphate. It is understood that total phosphate is not to include insoluble phosphates that may have been present in the original water and removed in sampling, unless expressly requested; in that case, such insoluble phosphate will be reported separately. Condensed phosphates, such as pyro-, tripoly-, and higher-molecular-weight species (from commercial phosphates like hexametaphosphate), are not normally present in natural waters, but are frequently added in the course of water treatment. The concentration employed depends on the application. Polyphosphates do not respond appreciably to the orthophosphate tests but can be hydrolyzed to orthophosphate by boiling with acid. Also, the insoluble phosphates can be dissolved by boiling with acid. Then, with the proper combinations of filtration and boiling with acid and the orthophosphate value, both the polyphosphates and insoluble phosphates can be determined as their equivalent PO_4.

1.2. Interference: Interference from iron should not exceed 0.04 mg Fe in the portion taken for analysis. At least 25 mg/l soluble silicates can be tolerated. Color and turbidity also interfere. Chromate and strong oxidizing agents, such as peroxide, bleach the blue color. Interference from nitrite (which also bleaches the blue color) can be overcome by adding 0.1 g sulfamic acid to the sample before adding the molybdate. Because of the very low PO_4 range, contamination is a problem.

Extracting the heteropoly acid into an immiscible solvent before reduction greatly reduces the number of interferences; however, it does not remove interference from arsenic and germanium. Extraction also reduces the amount of polyphosphate determined with orthophosphate.

1.3. Minimum detectable concentration: The minimum detectable concentration is about 0.01 mg/l PO_4. The sensitivity at 50 percent transmittance is about

0.01 mg/l for 1 percent change in transmittance.

2. Apparatus

2.1. Colorimetric equipment: Visual comparison in nessler tubes is not normally recommended, because of the difficulty in meeting the time requirement to obtain accurate results. One of the following is required:

a. Spectrophotometer, for use at approximately 690 mμ. The color system also obeys Beer's law at 650 mμ, with somewhat reduced sensitivity, in the event the instrument available cannot be operated at the optimum wave length. A light path of 0.5 cm or longer yields satisfactory results.

b. Filter photometer, provided with a red filter exhibiting maximum transmittance in the wave length range of 600-750 mμ. A light path of 0.5 cm or longer yields satisfactory results.

2.2. Filtration equipment: Membrane Filter

2.3. Acid-washed glassware: This may be of great importance, particularly when determining low concentrations of phosphate. Phosphate contamination is common owing to the formation of thin films or absorption on iron oxide films on glassware. Commercial detergents containing phosphate should be avoided. Glassware should be cleaned with hot dilute HCl and rinsed well with distilled water.

3. Reagents

3.1. Phenolphthalein indicator solution: Either the aqueous (a) or alcoholic (b) solution may be used.

a. Dissolved 5 g phenolphthalein disodium salt in distilled water and dilute to 1 liter. If necessary, add 0.02N NaOH dropwise until a faint pink color appears.

b. Dissolve 5 g phenolphthalein in 500 ml 95 percent ethyl alcohol or isopropyl alcohol and add 500 ml distilled water. Then add 0.02N NaOH until a faint pink color appears.

3.2. 10N H_2SO_4

Potassium persulfate $K_2S_2O_8$

3.3. Sodium hydroxide 1.0N. Dissolve 40 g NaOH in a small quantity of distilled water and dilute to 1 liter.

3.4. Stock phosphate solution: Dissolve in distilled water 0.7165 g anhydrous potassium dihydrous potassium dihydrogen phosphate, KH_2PO_4, and dilute to 1,000 ml; 1.00 ml=0.500 mg PO_4.

3.5. Standard phosphate solution: Dilute 100.0 ml stock phosphate solution to 1,000 ml with distilled water; 1.00 ml=50.0 µg PO_4.

3.6. Ammonium molybdate reagent (1): Dissolve 25 g $(NH_4)_6Mo_7O24.4H_2O$ in 175 ml distilled water. Cautiously add 280 ml conc H_2SO_4 to 400 ml distilled water. Cool, add the molybdate solution, and dilute to 1 liter.

3.7. Stannous chloride reagent (1): Dissolve 2.5 g of a fresh supply of $SnCl_2;2H_2O$ in 100 ml glycerol. Heat in a water bath and stir with a glass rod to hasten dissolution. This reagent is stable and requires neither preservatives nor special storage.

3.8. Reagents for extraction:

a. Benzens-isobutanol solvent: Mix equal volumes of benzene and isobutyl alcohol. (CAUTION: This solvent is highly flammable.)

b. Ammonium molybdate reagent (II): Dissolve 40.1 g $(NH_4)_6Mo_6)_{24}.4H_2O$ in approximately 500 distilled water. Slowly add 396 ml molybdate reagent (1). Cool, and dilute to 1 liter.

c. Alcoholic sulfuric acid solution: Cautiously add 20 ml conc H_2SO_4 to 980 ml methyl alcohol with continuous mixing.

d. Dilute stannous chloride reagent (II): Mix 8 ml stannous chloride reagent (I) with 50 ml glycerol. This reagent is stable for at least 6 months.

4. Procedure

4.1. If precipitate or turbidity is present in the bottled sample, two portions must be taken for analysis. One should consist of 50 ml of the filtered sample. (See

Sec. 2.2 for procedure on filtering the sample.) The other portion should consist of 50 ml of thoroughly mixed unfiltered sample. To each of the 50 ml portions, or aliquots diluted to 50 ml, add 1 drop of phenolphthalein indicator solution. If a red color develops, add 10N H_2SO_4 dropwise to discharge color. Then add 1 ml of 10N H_2SO_4 in excess and .4 g potassium persulfate to each.

4.2. Digest at boiling temperature for at least 30 minutes. Remove any suspended matter by filtration. Add 1 drop of phenol-phthalein indicator solution and neutralize to a faint pink color with sodium hydroxide solution. Restore portions to original 50 ml volume with distilled water.

4.3. Determine the orthophosphate content of each treated portion as described in 4.4, 4.5 and 4.6, adapted to a sample volume of 50 ml.

4.4. Add, with thorough mixing after each addition, 4.0 ml molybdate reagent (I) and 0.5 ml (10 drops) stannous chloride reagent (I). The rate of color development and the intensity of color depend on the temperature of the final solution, each 1°C increase producing about 1 percent increase in color. Hence, samples, standards, and reagents should be within 2°C of one another and at a temperature between 20° and 30°C.

4.5. After 10 min, but before 12 min., employing the same specific interval for all determinations, measure the color photometrically at 690 mμ and compare with a calibration curve, using a distilled-water blank. Light path lengths suitable for various phosphate ranges are as follows:

Approx PO_4 Range mg/1	Light Path cm
1-6	0.5
0.3-3	2
0.02-0.5	10

A blank must always be run on the reagents and distilled water. Inasmuch as the color at first develops progressively and later fades, it is essential that timing be the same for samples as for standards. At least one standard should be tested with each set of samples or once each day that tests are made. The calibration curve may deviate from a straight line at the upper concentrations of the 1-6 mg/l range.

4.6. Extraction: When increased sensitivity is desired or interferences need to be overcome, extract the phosphate as follows: Pipet a suitable aliquot of sample into a 100-ml graduated extraction cylinder and dilute, if necessary, to 40 ml with distilled water. Add 50.0 ml benzene-isobutanol solvent and 15.0 ml molybdate reagent (II).

Close at once and shake vigorously for exactly 15 sec. Any delay increases the amount of polyphosphate, if present, which will be included in the orthophosphate value. Remove the stopper and withdraw 25.0 ml of separated organic layer, using a pipet and a safety aspirator. Transfer to a 50-ml volumetric flask, add 15 to 16 ml alcoholic sulfuric acid solution, swirl, add 10 drops (0.50 ml) dilute stannous chloride reagent (II), swirl, and dilute to the mark with alcoholic sulfuric acid. Mix thoroughly: after 10 min. but before 30 min., read against the blank at 625 mμ. Prepare the blank by carrying 40 ml distilled water through the same procedure as the sample. Read the PO_4 concentration from a calibration curve prepared by taking known phosphate standards through the same procedural steps as the samples.

This completes the reading of the Technical Committee report.

MR. STEIN: Thank you for a very comprehensive and excellent technical report.

I really am overwhelmed. I want to thank you and the Technical Committee.

As you can see, we have given them quite a job, and this report, as I see it here, poses some very interesting questions and really comes to grips directly with the hard nub of the problems that we have to deal with.

I think the whole country is way ahead by this, and this is a signal service. Thank you very much.

Are there any comments or questions?

MR. POSTON: I would like to ask Mr. Harlow, with regard to the No. 7 on his introduction, where it says, "Identify other lake problems and explore ways of dealing with them," have you had any additional information on other lake problems?

MR. HARLOW: Well, there are a number of problems in Lake Erie that are not directly related to the phosphorus problems, and one of these that crops up from time to time that seems to plague us in the Great Lakes -- I remember it plagued us over in Lake Huron, and they talked about it in Lake Ontario -- is the dumping of car bodies in the Great

Lakes.

I have some pictures that I would like to show of this, to show these car bodies being dumped in the lake along the Cleveland waterfront, for consideration by the conferees.

These slides are mostly all alike, taken from the same place, and they show that along the Cleveland waterfront a City of Cleveland truck pushes these old car bodies into the lake. They are forming a dike with old car bodies. For what purpose, I am not quite sure.

MR. POSTON: What is that in the background there (indicating)?

MR. HARLOW: That is Lake Erie in the background, and there is a pile of car bodies dumped along the lake frontage right almost downtown Cleveland.

These car bodies, although we were told that they would be stripped of engines, tires, and so on, and that the oil and gasoline and grease would be removed, this was not the case. We found that they were just picked up off the street and dumped into the lake.

MR. POSTON: You mean they had the tires still on them?

MR. HARLOW: Tires and gasoline and oil and everything still in them.

MR. POSTON: What is the purpose of this?

MR. HARLOW: Well, they are building a dike, I understand, with car bodies, extending it out to where an old sunken ore boat is situated. They are going to build some kind, I guess, of recreation area out of it -- a scenic area out of it, maybe.

(Laughter.)

MR. OEMING: May I ask, is this picture you are showing us showing the car bodies on the ice? Is this what is going on?

MR. HARLOW: They are pushing them out. They are doing it now. It is ice-covered.

MR. OEMING: This is on the ice then?

MR. HARLOW: This is ice that is on Lake Erie. That is ice right there (indicating).

MR. POSTON: That is the lake in the background?

MR. HARLOW: Yes, that is the lake.

MR. POSTON: Are there two dikes there?

MR. HARLOW: That is an old dike, an old existing dike that was built out of rock many, many years ago.

MR. STEIN: Would you identify precisely the location where these pictures were taken?

MR. HARLOW: You mean in downtown Cleveland?

MR. STEIN: Where in downtown Cleveland? Can you state?

[redacted]

111b

MR. HARLOW: I don't know exactly, because I didn't take the pictures, Mr. Stein.

MR. STEIN: All right.

MR. HARLOW: I understand they were taken off Gordon Park.

MR. STEIN: When were the pictures taken?

MR. HARLOW: About a week or two ago.

MR. STEIN: All right.

MR. POSTON: Are these the only other problems that you came up with?

(Laughter.)

How about the beaches?

MR. HARLOW: Well, I think the committee certainly explored this in their aerial photography and in our general surveillance of the Lake Erie shoreline. We have taken a number of pictures of algae littering beaches. I think all the conferees know this occurs in Lake Erie, and it also occurs in Lake Ontario.

I did not bring these pictures with me, because I looked at them ahead of time and they didn't seem to characterize what we were trying to show. I didn't think they were of sufficient interest to bring before the conferees.

It just so happens that we have done our better picture-taking in Lake Ontario of algae-littered beaches.

However, it does occur in Lake Erie, of course, and we will be out this spring and summer taking good pictures.

MR. STEIN: Mr. Poole?

MR. POOLE: Well, to an extent, Mr. Chairman, I share your views as to the excellence of this report, and I recognize that the Technical Committee's primary mission was to study the problem of nuisance in Lake Erie. However, unless I have been completely misinformed, there are a good many other problems of pollution that have licked Lake Erie other than the problem of nutrients.

The thing that particularly disappoints me is that under Charge No. 7, which was to study the other pollution problems, the report completely ignores the problem of beaches. I don't think it is even mentioned in the report.

In Mr. Poston's questioning of Mr. Harlow just now, he has referred to the beaches only from the standpoint of algae washing up on them, and it seems to me that it is a terrible mistake if we should distribute this report without there being a clear understanding that there is going to be some comment.

I would remind you that we have zoned off a shore area that extends two miles from the shore, and certainly, unless Lake Erie is a good deal different from the south end of Lake Michigan, there must be a tremendous lot of bacterial problems in all of the major population centers that in my judgment at least have a very important bearing on the usability of the lake for what I would classify as its primary recreational asset; namely, swimming.

So I would like to suggest that the record clearly show that at least one conferee is of the feeling that the report does not take in the entire Lake Erie pollution situation.

MR. HARLOW: I certainly agree. There are certainly other things wrong with Lake Erie other than the algae.

MR. STEIN: We haven't discharged the Technical Committee yet, have we? You are still operating, aren't you?

MR. HARLOW: We'll run and hide now.

(Laughter.)

MR. STEIN: Well, I think Mr. Poole's statement is very pertinent.

The first thing that people and reporters in all the areas ask me when I go in is, "How about the beaches?" This is the first question you get, whether you get to Buffalo, Erie, Cleveland, Toledo, or Detroit. This is the question that is asked.

Let me say this: I have never seen a report that we have handed out to technical people that didn't come up with a significant number of recommendations when it referred to research. With all that, I think this report is quite a significant contribution.

However, I think if we are talking in terms of the water quality in Lake Erie, Mr. Poole has put his finger on what the people want to see in water quality. That is beaches that they can use.

MR. HARLOW: May I make a comment here?

In working through its deliberations, the Technical Committee naturally related the first six instructions directly to phosphorus and nutrients, and that kind of thing. The seventh instruction did cover to a certain extent what Mr. Poole is concerned about.

In regard to our surveillance program on Lake Erie, we are going to and have been studying the bacterial problems. We know the beaches are polluted. We know where they are. I would like to say, to a certain extent, if the committee continued its deliberations and explored these kinds of things, our agency -- the Federal Water Pollution Control Administration -- is already almost at the point of releasing a report on Lake Erie which covers in detail all of the problems -- not just that of nutrients, but all of the problems. We are shooting for a target release date of August.

This is a comprehensive study of Lake Erie, and it goes into much, much greater detail of all the problems than we went into in the small technical report.

MR. POOLE: I don't want to belabor this continually, but I don't want the people out there -- and certainly the people at the table right here -- to leave here today with the idea that the conferees, or at least this conferee, feels that algae and nutrients are the only problem that afflict Lake Erie.

MR. STEIN: Mr. Oeming?

MR. OEMING: Mr. Chairman, in defense here of the committee -- and I don't know that they need my defense -- but in defense of them, if I recall correctly, this committee started out with the mission of examining the nutrient problem, as Mr. Harlow has said. If I recall correctly, the last item in this mission was inserted at the direction of the Chairman of this conference (laughter). I don't recall that the conferees were particularly anxious -- I think we all knew what the other problems were, but, for some reason, the Chairman felt differently.

Now, I want to add my word of commendation and appreciation to this committee for the hard work that it has put in. I think they have made a very constructive addition here to our knowledge, and particularly with reference to the nutrient problem.

I see in this report some work for the conferees. I am not in disagreement with the recommendations or the conclusions as a whole, but I can see where something now needs to be done by the conferees to follow up. By this I mean implementation.

The process that we have been following here is to take recommendations and conclusions, and then the conferees consider these and determine what is needed in the way of implementation. With all due appreciation to the committee, I think that the conferees now ought to have the opportunity, before it accepts this report, to review the report in the light of what needs to be done now, what the conferees should come up with as recommendations to the States, the Federal Government, and everyone involved, to implement these conclusions and recommendations.

So, I would suggest that we receive this with a deep appreciation, and that the conferees consider these conclusions and come up, in whatever period of time you wish, Mr. Chairman, that is acceptable to the conferees, with its views on what it proposes to do -- that is, the Board proposes to do.

MR. STEIN: Are there any further comments or questions?

MR. POOLE: I agree with that.

MR. STEIN: Mr. Lyon?

MR. LYON: Yes, I have a few comments, one relating to what Mr. Poole has said.

First of all, let me say that I am not in a position to commend the committee, because I was one of its members (laughter), but I do agree with the report and, as Mr. Oeming has pointed out, the need now to move ahead and do something about the problem.

However, in connection with what Mr. Poole has said about beaches, we in Pennsylvania are very concerned with some of the publicity that has been given us about Lake Erie, and particularly about its beaches.

The beaches in Pennsylvania at present are fine. We have checked them carefully. They meet our standards for bathing water quality, and if the people who live along Lake Erie do not have any other good beaches to go to, we hope that they will all come to Pennsylvania, because we have frankly noted a significant diminution of our pollution in the Lake Erie portion of Pennsylvania. We believe this is due to the publicity that has been so freely available about the pollution of the lake, and we think this problem is important.

I think people ought to know about these things before they can do anything about it, but we also want the people to know that the beaches at present are fine, and that they can go swimming there.

In relation to the report itself, I feel that there is one aspect of it that needs to be given some further attention, hopefully if the committee will continue its work, and this is the point that we talked about earlier.

It is touched upon on Page 15 under Instruction 7, where, in the second paragraph, it says: "It was brought to the attention of the committee that bottom sediment storage may contribute to the phosphorus supply of the lake water."

This is certainly one of the areas that ought to be studied more. Clearly, we have to cut way, way down on the phosphorus input. In this connection I might suggest that future reports, as in Conclusion No. 5, we might say to make it a little clearer, that "the one nutrient most susceptible to control of input is phosphorus."

We can control the input, but I am not sure that we know what this will do, and how fast it will reduce the phosphorus levels in the lake. It will certainly reduce them, but we don't know how fast. In that connection again, I feel that we perhaps should have said something about the need to study the relationship between the phosphates that are trapped in the lake and the phosphates in the lake level.

MR. STEIN: Mr. Harlow?

MR. HARLOW: May I make one comment to this, Mr. Lyon?

The committee considered this, what contribution to the lake is coming from the bottom sediments of phosphorus, and we looked all through the literature and sought out experts on this. Nobody could really tell us a great deal on this, and we felt we explored it as much as we could.

The information is not there. We have asked, but it is not there.

MR. LYON: This is why I suggested that on the recommended studies, this be given more attention, because it is certainly a highly pertinent question. We might even want to go further and do what was talked about earlier and just try to figure out what the price tag would be to getting rid of some of these.

MR. HARLOW: One thing we were able to determine, at least from the information we had, was given to us by the Bureau of Commercial Fisheries.

It is their feeling that the phosphorus that is released from the bottom muds during low DO is reprecipitated back into the bottom muds during the fall turnover, and does not ever reach the upper waters of the lake, where the algae blooms. That is mentioned in the report there.

MR. LYON: You heard that quote from Clair Sawyer this morning. He seems to feel differently.

Clearly, this is an area that should be studied a lot more.

MR. STEIN: Are there any further comments or questions?

Mr. Poston?

MR. POSTON: I might make the comment that, as usual, Blucher Poole comes through and gets at the nub of a report very clearly.

I would say that I would agree with him that taking into consideration No. 7, the report has not brought out the real problem of beach pollution, because beaches are the first consideration of the general public, as I have observed. In other words, they think in terms of bathing, largely.

The summary of the second session of the conference, August 10 to August 12, 1965, does carry a Recommendation No. 9, which says:

> "Disinfection of municipal waste effluents is to be practiced in a manner that will maintain coliform densities not in excess of 5,000 organisms per 100 milliliters at water intakes, and not in excess of 1,000 organisms per 100 milliliters where and when the receiving waters in proximity to the

"discharge point are used for recreational purposes involving bodily contact. It is recognized that bathing water quality standards are established by statute in New York State."

MR. METZLER: What page is that on?

MR. POSTON: Page 7.

I don't know that this is a reason for the Technical Committee not considering bacteriological quality, but I think the conferees are charged or have here agreed that measures with regard to bacteriological problems are to be taken into consideration in our time schedules and in our treatment works. I feel like Mr. Oeming, that further consideration by the conferees should be given to this Technical Committee report before it is given the blessing of this committee.

MR. STEIN: Thank you.

Are there further comments or questions?

MR. POOLE: I concur in Mr. Oeming's suggestion.

MR. EAGLE: Mr. Chairman?

MR. STEIN: Yes, Mr. Eagle.

MR. EAGLE: I would just like to remark that if we had Mr. Poston's report that was due last July that was supposed to include all these things, this discussion would be very academic.

MR. POSTON: Isn't it on your desk now, Mr. Eagle?

MR. EAGLE: In a very rough draft form, and very secretive and confidential.

(Laughter.)

MR. STEIN: One thing, Blucher: We did see these old cars and riffraff in the rivers up in Alaska. I didn't know they were doing it here.

In Alaska, to maintain the streams against the ice thaw in the spring, in various parts of the State where the stream rushes down and kind of rips through the backyards of the people, they take all their old automobiles and run them off the banks. Then, when the ice melts, it kind of flattens out the car, and they have a relatively stable bank.

I am not sure that we have to do that down in Lake Erie, though.

MR. POOLE: Well, the farmers in Indiana use that in the bends of the rivers to keep it from cutting away land. I don't know what the Indiana Pollution Control Board is going to do if every automobile in the river becomes pollution. They may get into trouble with some of these landowners.

MR. STEIN: Mr. Poston?

MR. POSTON: That completes our Federal report.

I might ask: Are there further instructions for the Technical Committee at this time?

MR. STEIN: I think we will let the conferees deliberate on that without making a judgment at this time.

MR. POSTON: All right.

MR. OEMING: Let's put it on a stand-by basis, Mr. Chairman, subject to call by the conferees.

MR. STEIN: May we have Pennsylvania? Let's see if we can push through without a break, and go right through to lunchtime.

STATEMENT OF WALTER A. LYON, CONFEREE AND DIRECTOR, DIVISION OF SANITARY ENGINEERING, PENNSYLVANIA DEPARTMENT OF HEALTH

MR. LYON: I think all of you have received a copy of our report, which I passed out this morning, in the green covers.

This report has been prepared for the conferees representing the States of Indiana, Michigan, Ohio, New York and the Federal Government to bring them up to date on the steps that Pennsylvania has taken to carry out the recommendations of the 1965 conference. Subsequent to the 1965 conference, a written report was forwarded to the Federal Government conferee, Mr. H. W. Poston, on May 26, 1966; and a verbal report was given to a reconvened session of the conference on June 22, 1966.

After receiving a copy of the conclusions and recommendations of the 1965 conference, Pennsylvania's Sanitary Water Board took action to implement applicable recommendations. Those recommendations on which the Sanitary Water Board took action were Numbers 8, 11, 12, 14 and 17.

Recommendation 8 required that secondary treatment plants be so designed and operated as to maximize the removal of phosphates. The Sanitary Water Board directed the five municipalities having significant sewage discharges in the Pennsylvania portion of the Lake Erie Basin to conduct studies to determine the present degree of phosphate removal and the type of operation of the present treatment works that will provide maximum phosphate removals and report on this matter to the Sanitary Water Board.

The reports of the municipalities indicated that the phosphate reductions varied from 7 percent to more than 50 percent, but there were no consistent phosphate removals. This is a matter in which research and development work is currently being carried out in other locations in the country. Phosphate reductions agreed to by the conferees will be utilized in the Pennsylvania portion of the Lake Erie Basin as soon as engineering design criteria which will attain these ends are issued by the Federal Water Pollution Control Administration. So far, such design criteria have not been made available.

I might also point out in passing here that naturally, if we get such criteria from other sources and they are backed up by reliable work, we will use them. I am not trying to imply here that we would only use the ones from the Federal Water Pollution Control Administration.

Recommendation 11 dealt with the prohibition of combined storm and sanitary sewer construction and the elimination of such sewers in areas where they exist. The City of Erie is the only municipality in the Pennsylvania portion of the basin that contributes significant discharges from this source. Pollution has occurred in the past from wastes discharged during major storms through approved storm water by-passes on Erie's combined sewer system. The city has begun a program of separating storm and sanitary sewers in redevelopment areas. Complete separation has been completed in one 12-block area and a second project is under design. It is estimated that it will cost $22 million to separate all the combined sewers in the city. The city has also instituted a program of inspecting all overflow regulators on a daily basis and has taken steps to increase the volume of flow directed to the sewage treatment plant. The treatment plant is designed to treat 45 million gallons per day and flows in excess of this volume reaching the plant during major storms receive chlorination prior to discharge. The city has completed a program of abating the major discharges of industrial wastes to its storm sewer system. The city is also currently surveying its system to locate and eliminate minor sources of industrial wastes which are untreated.

Recommendation 12 directed that programs be developed to prevent accidental spills of waste material to Lake Erie and its tributaries. The Sanitary Water Board directed that letters be sent to all industrial plants in the Lake Erie Basin notifying them of the conferees' conclusion and asking them for reports of the measures that the company takes or has taken to implement such a recommendation. Replies were received from all the plants which we believe could discharge wastes and have a significant effect on the water quality of Lake Erie. The replies indicated that adequate steps are being taken to prevent accidental spills.

Recommendation 14 states that disposal of garbage, trash and other deleterious refuse in Lake Erie or its tributaries should be prohibited and that existing dumps along river banks and the shores of Lake Erie be removed. The Department of Health conducted a survey of existing dumps in the Pennsylvania portion of the basin in a joint survey with the U. S. Public Health Service and the Erie County Department of Health. Nineteen sites were visited, and of these, nine were found to be contributing to the pollution of tributaries of Lake Erie. Recommendations were made to close five sites and convert four sites into satisfactory sanitary landfill operations. The landfill operations in Erie County are being kept under close surveillance to insure that water pollution from sanitary landfills is prevented or abated.

Recommendation 17 required that the State water pollution control agency undertake action to insure that industrial plants discharging wastes into the waters of Lake Erie and its tributaries institute programs of sampling their effluents to provide necessary information about waste outputs. The Sanitary Water Board requested that the Department of Health review the adequacy of its industrial waste data on effluents from industries in the Pennsylvania portion of the Lake Erie Basin. The Department of Health reported that the information currently being provided by most of these industrial establishments adequately describes the quality of the discharges to Pennsylvania waters. A half dozen industrial plants recently received notices to provide additional information in their operating reports that are routinely submitted to the Department.

The conferees also agreed that secondary treatment or its equivalent should be given to all wastes prior to discharge to Lake Erie. Currently, one municipality with a population of 2,500 and a nursing home in the Pennsylvania portion of the basin do not have adequate facilities to provide secondary treatment of sewage. The Borough of Girard needs modification of its settling facilities and addition of chlorination facilities. The borough has submitted a satisfactory schedule and the schedule is included in Table I. Alpine Manor Nursing Home has an overflowing septic tank. Normal administrative procedures did not result in abatement of the discharge and we are taking legal action here.

Although the sewage treatment plant serving the City of Erie was designed to remove 70 percent of the biochemical oxygen demand loading, it is removing more than 85 percent of the BOD, with monthly averages frequently exceeding 90 percent. The city is considering plant modifications to increase the design capacity to allow for future growth of the city and adjacent municipalities. It is also considering accepting certain wastes from the Hammermill Paper Company.

Pennsylvania has, since 1954, had a program of financial assistance for operation and maintenance of municipal sewage treatment plants. Payments made annually are based on 2 percent of eligible construction costs.

Pennsylvania has contributed approximately $45 million through this program to the municipalities as compared with approximately $38 million under the Federal Water Pollution Control Program for the same period. This year, Pennsylvania's legislature has passed legislation to establish a half billion dollar land and water reclamation and conservation fund. This fund would be established by a bond issue which must be approved by a referendum. It is planned to include this bond issue question on the primary election ballot in May. Approximately one hundred million dollars of this fund is to be used for construction grants for sewerage treatment plants.

Table I lists the status of the sewerage cases in the Pennsylvania portion of the Lake Erie Basin.

TABLE I

SEWERAGE STATUS
(March, 1967)

Case Name	Municipality	County	Pop. Served	Receiving Stream	Adequate Trt. Fac. Provided
Erie	Erie City	Erie	140,000	Lake Erie	Yes
North East	North East Boro	Erie	4,200	16 Mile Cr.	Yes
Girard	Girard Boro	Erie	2,500	Elk Creek	No*
Albion	Albion Boro	Erie	1,900	Conneaut Cr.	Yes
Lake City	Lake City Twp.	Erie	1,700	Elk Creek	Yes

* Settling facilities modifications and chlorination needed. Schedule submitted as follows:

Plans - Completed

Advertise for Bids - June 15, 1967

Receive Bids - July 15, 1967

Begin Construction - August 30, 1967

Complete Construction - August 30, 1968

Case Name	Municipality	County	Pop. Served	Receiving Stream	Adequate Trt. Fac. Provided
Fairview School	Fairview Twp.	Erie	700	Trout Run	Yes
Erie County Home	Fairview Twp.	Erie	675	Trout Run	Yes
Greene Twp. Elementary School (Wattsburg	Greene Twp.	Erie	600	Four Mile Cr.	Yes
Talarico Truck Stop	Springfield Twp.	Erie	547	Raccoon Cr.	Yes
Howard Johnson Motor Lodge	Summit Twp.	Erie	420	Walnut Creek	Yes
Behrend Center (Penn State University)	Harborcreek Twp.	Erie	400	Trout Run	Yes
Harborcreek Twp. School	Harborcreek Twp.	Erie	400	Trout Run	Yes
Oakdale Corporation (Holiday Inn)	Summit Twp.	Erie	350	Walnut Creek	Yes
Poplar White Thru Way	McKean Twp.	Erie	300	Elk Creek	Yes

Case Name	Municipality	County	Pop. Served	Receiving Stream	Adequate Trt. Fac. Provided
Terrace Rest. (Boyd C. Chivers)	Fairview Twp.	Erie	300	Brandy Run	Yes
Mums Motel	North East Twp.	Erie	250	Trib. of 20 Mile Cr.	Yes
Conneaut Valley Union Joint Elem. School	Spring Twp.	Crawford	220	Conneaut Cr.	Yes
Kahkwa Club	Fairview Twp.	Erie	200	Walnut Creek	Yes
Lakeshore Country Club	Fairveiw Twp.	Erie	200	Unnamed Trib. of Lake Erie	Yes
Presque Isle State Park	Presque Isle	Erie	200	Erie Harbor	Yes
Traveler's Rest	Summit Twp.	Erie	175	Walnut Creek	Yes
Fairview Twp. Industrial Development Corp.	Fairview Twp.	Erie	165	Trout Run	Yes

Case Name	Municipality	County	Pop. Served	Receiving Stream	Adequate Trt. Fac. Provided
Rondal Convalescent Home	Summit Twp.	Erie	134	Trib. Walnut Cr.	Yes
Humble Oil and Refining Company	McKean Twp.	Erie	128	Trib. Thomas Run	Yes
Summit School District	Summit Twp.	Erie	110	Walnut Cr.	Yes
Interpace Corp.	Fairview Twp.	Erie	100	Walnut Cr.	Yes
Larry's Truck Stop (Lawrence Boyd)	North East Twp.	Erie	100	Averill Run	Yes
Wenner's Esso Station (Humble Oil Co.)	Fairview Twp.	Erie	90	Brandy Run	Yes
Wilson Motel	North East Twp.	Erie	90	Unnamed Trib. 16 Mile Creek	Yes
Alpine Manor	Fairview Twp.	Erie	50	Trout Run	No*
Georgetown	McKean Twp.	Erie	40	Elk Creek	Yes

*Case involves an overflowing septic tank at a nursing home. The case is being handled under the enforcement provisions of the Clean Streams Law. No schedule has been submitted.

Three industrial waste cases in the Lake Erie Basin do not have adequate treatment facilities. Although the Hammermill Paper Company has eliminated a substantial portion of its wastes from Lake Erie by injecting it into deep wells, the remainder of the wastes are still not in compliance with Sanitary Water Board requirements or the recommendations of the Lake Erie conferees.

At its last meeting the Sanitary Water Board considered an abatement schedule submitted by the Hammermill Paper Company. The schedule calls for treatment of the company's wastes at the City of Erie's sewage treatment plant.

Since this was printed, the Board has published this report, and I will pass to you a copy of the order of the Board which shows the recommendations of the Department of Health, which the Board unanimously adopted. I will merely summarize, but I would appreciate it if this item in the order of business were made part of the record.

MR. STEIN: It will appear, without objection, in the record as if read.

MR. LYON: Thank you.

Notes for O. C., Sanitary Water Board Meeting - March 15-16, 1967

G. Industrial Wastes - Request for approval of schedule for construction of treatment works.

Division Recommendation: (1) That the Board deny the request for approval of schedule for construction in the following case.

(2) That the Board issue the following order:

(A) In the event that the company discharges wastes to the City of Erie sewer system for treatment by the city, the following permits issued to the company shall be revoked on December 15, 1970:

Permit No.	Dated	Subject
1068-IW	March 11, 1949	Paper mill waste waters
1349	Sept. 19, 1950	Debarking wastes
1554	July 23, 1952	Paper mill wastes

(B) In the event that the company elects to provide treatment of its wastes by construction of its own treatment facilities, the discharge to surface waters of Lake Erie shall be effective December 15, 1970, limited to 22,800 pounds per day of biochemical oxygen demand, and 14,100 pounds per day of suspended solids. The discharge shall be free of foam and shall not contain objectionable amounts of color. Facilities to achieve compliance with this order shall not be constructed until a permit for construction has been issued by the Board.

(C) The company shall submit a schedule within 60 days of receipt of this order indicating the steps to be taken to achieve compliance with the order of November 16, 1966, in the event that agreement cannot be reached with the City of Erie for treatment of its industrial wastes by the City of Erie.

(D) The Board shall notify the company of its intent to revoke its permits for discharges to Lake Erie in the event an acceptable schedule is not submitted in accordance with Item C.

Name Location Type of Industry Mailing Address	Receiving Stream Degree of Treatment	Date of Order
Hammermill Paper Co.	Lake Erie	Nov. 16, 1966
Erie, Erie.Co.	Complete	
Pulp and Paper Mill		
Erie, Penna. 16512		
Attn: D. T. Jackson, Vice Pres.		

Remarks

The Board ordered this company to provide complete treatment of industrial wastes on February 26, 1946. The company has been granted ten extensions of time The eleventh request was refused by the Board, but a schedule of compliance expiring July 31, 1966, was approved.

An order was issued on November 16, 1966, requiring the company to submit a new schedule indicating the steps that will be taken to provide complete treatment of all industrial wastes. The company submitted the attached schedule for abatement by joint treatment of industrial and municipal wastes by the City of Erie. The dates in the schedule seem to be reasonable for construction of a project of this size.

We requested the company to submit an alternate schedule to indicate its plans in the event that an acceptable agreement between the company and the City of Erie might not be reached. The company has not submitted such an alternate schedule committing itself to compliance with the Board's order and the schedule submitted is in that sense incomplete and unacceptable.

Schedule submitted by Hammermill Paper Company
on February 7, 1967, and
amended on March 7, 1967

March 15, 1967	All long delivery equipment on order.
March 31, 1967	Engineering design completed.
April 15, 1967	Contract let for construction.
August 1, 1967	Start pilot plant operation (depends on delivery of equipment)
October 1, 1967	Commence negotiations with the City of Erie and the Sewer Authority on a contract dealing with the construction and operation of a full-scale joint treatment facility.
December 31, 1967	Complete pilot plant study.
December 31, 1967	Conclude the basic negotiations for an agreement between the City, Authority and Hammermill. This should cover the construction and operation of a plant to jointly treat Hammermills' waste with city sewage and Hammermills' participation in construction and operating costs. Hammermill will make every reasonable attempt to reach such an agreement. Since other parties are involved, there may be

	delays which are beyond our control.
February 15, 1968	Final report on pilot plant study.
February 15, 1969	Completion by Consoer, Townsend & Associates of Final Plans and Specifications.
May 15, 1969	Allowing 90 days for advertising for bids, receiving of bids, completing financial negotiations, securing of approvals and permits, contracts could be awarded.
December 15, 1970	Completion and placing the new facilities into operation.

- - - -

The Parker White Metal Company in Fairview Township, Erie County, has not complied with the Clean Streams Law or the orders of the Sanitary Water Board. This case is being handled under the enforcement section of the Clean Streams Law. No satisfactory schedule has yet been submitted.

At its February 1967 meeting, the Sanitary Water Board ordered the Erie Reduction Company, a fertilizer and rendering company in Erie, to abate its discharge or treat its waste. The Sanitary Water Board order included a compliance date of March 1, 1968. The company has not yet submitted a detailed schedule.

Table II is a summary of the status of industrial wastes cases in the Pennsylvania portion of the Lake Erie Basin.

TABLE II

INDUSTRIAL WASTE STATUS

March, 1967)

Case Name	Location	Type Establishment	Receiving Stream	Adequate Trt. Fac. Provided
	CRAWFORD COUNTY			
Albro Packing Company	Springboro	Food Processing	Conneaut Cr.	Yes
Sealtest Foods	Springboro	Milk Processing	Conneaut Cr.	Yes
	ERIE COUNTY			
Hammermill Paper Co.	Erie	Integrated Pulp and Paper	Lake Erie	No*
Interlake Steel Corp.	Erie	Integrated Steel Mill	Lake Erie	Yes
Kaiser Alum. & Chem. Corp.	Erie	Aluminum Products	Motch Run	Yes

* Additional Treatment Required - Report on Sanitary Water Board action on proposed abatement schedule to be given at March 22 conferees' meeting.

Case Name	Location	Type Establishment	Receiving Stream	Adequate Trt. Fac. Provided
Penelec Company	Erie	Electric Power	Erie Bay	Yes
Ruberoid Company	Erie	Coated Asphalt Products	Erie Bay	Yes
Welch Grape Juice Co.	North East	Food Processing	16 Mile Creek	Yes
J. McCormick Constr. Co.	Wesleyville	Construction Materials	4 Mile Creek	Yes
Nickel Plate Sand & Gravel	Fairview Twp.	Sand Washery	Trout Run	Yes
Erie Ceramics	Millcreek Twp.	Porcelain Enamel Products	Unnamed Trib. to Lake Erie	Yes
Erie Brewing Co.	Erie	Brewery	Mill Creek	Yes
Int. Pipe and Ceramics Corp.	Fairview Twp.	Concrete Pipe	Walnut Creek	Yes
Parker White Metal Co.	Fairview Twp.	Metal Products	Trout Run	No**

** This case is being handled under the enforcement provisions of the Clean Streams Law. No schedule has yet been submitted.

Case Name	Location	Type Establishment	Receiving Stream	Adequate Trt. Fac. Provided
Gunnison Brothers	Girard	Tannery	Brandy Run	Yes
General Electric Co.	Lawrence Park Twp.	Heavy Machine Manuf.	Lake Erie	Yes
American Sterilizer Co.	Millcreek Twp.	Hospital Equip.	Cascade Creek	Yes
Ervite Corp.	Millcreek Twp.	Steel Products	Unnamed Trib. to Lake Erie	Yes
W. Ridge Gravel	Girard Twp.	Sand & Gravel Washery	Unnamed Trib. to Lake Erie	Yes
Erie Reduction	Erie	Rendering Plant	Lake Erie	No***

*** At its February 1967 meeting the Sanitary Water Board ordered the company to abate its discharge or treat its waste. The construction order included a compliance date of March 1, 1968.

Pennsylvania Department of Health personnel have served on the Enforcement Conference's Technical Committee, which is investigating the nutrient problem of Lake Erie and carrying out the assignment given to it by the conferees.

In November 1966, the Pennsylvania Sanitary Water Board held a hearing to establish water quality standards for Lake Erie. Testimony presented at the hearing is being reviewed and proposed standards are currently being developed by the Department of Health for inclusion in the abatement plan to be submitted to the Secretary of the Interior. Appropriate recommendations will be made to the Sanitary Water Board in the very near future. The Department of Health has recommended that the Sanitary Water Board establish nutrient standards for Lake Erie after the conferees consider the recommendations of the Technical Committee that was created.

I think this is an important point, Mr. Chairman, since we feel that agreement on nutrient levels among the States represented among the conferees is essential before Pennsylvania can set an abatement plan for nutrients.

The Pennsylvania Legislature authorized and appropriated funds for the construction of a water pollution control laboratory to be located in Erie. Routine bacteriological and chemical analyses for the Lake Erie area will be performed in this laboratory rather than our central laboratory.

Arrangements are currently being made to obtain a site for the laboratory.

That concludes our report.

MR. STEIN: Thank you.

Are there any comments or questions?

MR. POSTON: I would like to ask Mr. Lyon if there is any difficulty in obtaining industrial waste data for open file?

MR. LYON: No. You are free to obtain any data that we have.

MR. POSTON: What I had reference to was whether there was any difficulty in your obtaining industrial waste data.

MR. LYON: We have had no difficulty. We have had no problems.

MR. POSTON: Thank you.

MR. STEIN: Any other comments or questions?

MR. OEMING: Mr. Chairman?

MR. STEIN: Yes, Mr. Oeming?

MR. OEMING: I would be interested in knowing, Mr. Lyon, what basis would be provided in this bond issue for grants. On what percentage basis? Has that been spelled out?

MR. LYON: Yes. It is not in the legislation, but we plan to use this $100 million to match the Federal 30 percent, or whatever the Federal grants will be, in accordance with the Federal Water Pollution Control Act.

MR. OEMING: I see.

MR. LYON: In a general way, that is how we plan to use it, although now it looks as if the money will hardly go anywhere in meeting our needs. We have 102 applications, and if we were just to pay 30 percent to all of them, we would need an allotment from the Federal Government of $25 million. That won't even meet the maximums in the Federal law. All we are going to get is $10 million, so we are going to use a lot of this State money to augment the Federal funds in addition to matching, hoping to get the money back at a later date.

MR. STEIN: Are there any further comments or questions?

(No response.)

MR. STEIN: If not, Mr. Lyon, is the story true that I hear that the cover is an algae bloom of blue-green, and as soon as we clear it up in Lake Erie, you are going to change the color of your cover?

(Laughter.)

MR. LYON: That is correct. We wanted to commemorate the algae problem and thereby made the color green. We will change the color when the problem is solved.

MR. STEIN: Thank you.

(Laughter.)

I think you have raised one significant point that we should get an agreement on from the conferees, this notion of nutrient standards for the lake, which I think is vital.

Maybe the feeling is that the conferees want to examine the technical report a little more, because I think establishing the nutrient standards, as you can appreciate here, the indication of where the phosphates come from has significant implications for particularly the soap and detergent industry and every household in the country. I think we are going to have to consider that carefully.

The question is whether you want to grapple with that today, or go back to think about it and get together later. I won't poll you on that yet until this afternoon.

I have one other point dealing with dumps, on Page 2 of your report. Do I understand that exists along the banks and along the shores of the rivers?

MR. LYON: This is the whole watershed, not just along the riverbanks. I don't believe any of them are right on the lakeshore, are they?

MR. LARRY MILLER: No.

MR. STEIN: But, as far as you are concerned, your plans are just to clean up nine of the nineteen and allow ten to continue with dumps?

MR. LYON: No.

MR. STEIN: That is not clear. I think that is what the clear implication is.

MR. LYON: Let me say this: That if these are open dumps and they are not in fact causing pollution -- and I do not believe that any of them are in the lake itself -- we under our pollution law cannot take any action against them; but if they are causing pollution as I have indicated here, we have required and will continue to require that som thing be done to correct it.

As I have read here, recommendations were made to close five sites and to convert four of them in a satisfacto landfill operation. If these are not carried out, appropria enforcement action will be taken.

We did have one problem -- I don't think it was a dump problem -- where the Erie Yacht Club did have a fill, sort of a breakwater that they were building into the lake, and they were using some materials in that that we felt might cause pollution. They were taken to court, and, I believe, fined $500. That practice has now stopped.

MR. STEIN: One last question.

As I look at the Hammermill dates, the date for completion, at least in your projected order, is December 15, 1970.

Do you anticipate that all the works will be completed on or before this date, and I am talking about municipal and industrial? Is this your outside date for full completion?

MR. LYON: Yes.

MR. STEIN: I don't just mean Hammermill. No city or industry that is under your jurisdiction will have works still pending by December 15, 1970? They will all be complete

MR. LYON: Well, this is correct, except, you know, there is just one small industry we have had to take -- you notice the schedule for the Borough of Girard has a date of compliance by August 30, 1968.

Now, the industry that we have had to take to court is Parker White Metal, if you recall. That is in court, and since I am not an attorney, Mr. Stein, I cannot set a schedule for the court. You know that sometimes the courts take a lot of time.

MR. STEIN: Well, you are the best reasonable facsimile of an attorney I have seen.

However, we all recognize that. This is the point we have in every case. If you go to court, obviously this is out of your hands.

MR. LYON: Right.

MR. STEIN: The only thing that we can ask here is that the administrative agency take action, and that your dates will call for completion before that.

Of course, everyone has the right to go to court, and they should have it. We recognize that this is something that is possibly at least as important, if not more important than, pollution control -- everyone's right to have his day in court under our system. I don't think we would argue with that.

Mr. Poole?

MR. POOLE: Does this December 15, 1970, date include nutrient removal?

MR. LYON: The Hammermill Paper Company does not have a nutrient problem. That is where the date comes from.

MR. POOLE: Mr. Stein's question to you, though, was does this include all of Pennsylvania's, and I thought your answer was "yes."

MR. LYON: I don't think we have any particular schedule at this point for nutrient removal. We have to be able to get the engineering design data to be able to assign dates, so I don't think we can set any schedule until the engineering design information is available.

MR. POOLE: This is Indiana's feeling. That is why I asked the question.

MR. LYON: Yes.

MR. POOLE: I wanted to know whether you were committing yourself to nutrient removal in Erie, to be specific, by December 15, 1970.

MR. LYON: Only to the extent that it can be maximized with the existing facilities, but this may, as we well know, not be enough, and to set the standards which hopefully will be set for the nutrients, we cannot commit ourselves to the schedule until the engineering design information is available.

MR. STEIN: Thank you for that clarification.

Are there any further comments or questions?

MR. POSTON: I might, for your information, say that I have just received word that Trenton, Michigan, has received a demonstration grant for construction of a phosphate removal pilot plant.

MR. STEIN: Are there any other comments or questions?

(No response.)

MR. STEIN: Let's try to take Indiana before we go to lunch.

STATEMENT OF PERRY MILLER, ASSISTANT DIRECTOR, DIVISION OF SANITARY ENGINEERING, INDIANA STATE BOARD OF HEALTH, INDIANAPOLIS, INDIANA

MR. MILLER: Mr. Chairman, Conferees, Ladies and Gentlemen:

My name is Perry Miller. I am the Assistant Director of the Division of Sanitary Engineering in the Indiana State Board of Health, and I am presenting here a statement on behalf of the Indiana Stream Pollution Control Board.

The Indiana Stream Pollution Control Board has made every effort to carry out the recommendations of the conferees at the conference in the matter of pollution control of Lake Erie and its tributaries, held on August 3, 1965. A progress report was presented at June 22, 1966, meeting of the conferees.

A public hearing on water quality was held at Fort Wayne on November 21, 1966, concerning the Maumee River Basin. A summary report on the water quality and implementation was prepared for this hearing. Testimony received at this hearing was considered by the Board and amended criteria were adopted on February 21, 1967. A hearing on the amended criteria was held on March 17, 1967. These criteria were adopted by the Stream Pollution Control Board at its meeting yesterday, March 21, 1967.

A report showing a revised implementation plan, which includes the amended water quality criteria, has been prepared.

The collection of data has continued at the four water quality monitor stations in the basin. The data for 1965 and 1966 are shown in the appendix.

Industrial

Effluent monitoring programs have been established at 16 of the 22 industries in the basin. These data are maintained in open files. The remaining industries, with the exception of Franke Plating Company, Fort Wayne, were not required to establish monitoring programs. Franke Plating will reestablish the effluent monitoring program started in 1966.

Three industrial plants have improved or constructed new treatment or control facilities since the Status Report given on June 22, 1966.

Of the 22 industrial plants in the basin, 15 have adequate waste control facilities and seven need additional treatment works. Six have waste treatment projects in the planning stage and the Board has initiated enforcement action with Parrot Packing Company, Inc., Fort Wayne.

Municipal

Effluent chlorination facilities are to be provided by Avilla, Berne, Butler, Fort Wayne, Garrett, and Waterloo by the end of 1968. The other municipalities in the basin will be required to place existing chlorination facilities in use and, where necessary, provide improvements to these facilities in order to effect adequate effluent chlorination. Year-around chlorination of effluents will be required in the basin to protect water quality for downstream uses of public water supply. However, chlorination for purposes of protecting recreational uses will be required from April 1 through October 31 in the St. Mary's River sub-basin.

Phosphate removal will be required at Fort Wayne as soon as practicable methods are developed.

The Board will require completion of construction of needed waste treatment control facilities for industries and municipalities by the end of 1968. If it appears that the date will not be met, the Board will take the action needed to insure compliance.

I might say here in connection with trash dumps that the Izaak Walton League in Fort Wayne did report about 30 to us in the basin. All of them were investigated, and we know of no effect upon the quality of interstate water.

Also, all municipalities have secondary treatment facilities. Industries are relatively small. Therefore, we have not required dates for submission of preliminary plans and final plans, letting the contracts, etc. Our report will cover only completion of facilities.

MAUMEE RIVER BASIN

Fort Wayne

The City of Fort Wayne is continuing effective operation and maintenance of its sewage works facilities. Recent monthly reports indicate average effluent BOD of less than 20 mg/1 and suspended solids less than 15 mg/1.

Better phosphate removal has not been achieved. The soluble orthophosphate in the final effluent averages approximately 15 mg/1 as PO_4. The proposed grant by the Federal Water Pollution Control Administration for a plant study on phosphate removal was not approved for the city.

The city applied for a demonstration grant to the Federal Water Pollution Control Administration to provide treatment of the overflow from combined sewers for approximately one-seventh of the city's drainage area; however, the proposed project was not approved for a grant. The proposed project provided for settling of storm overflows, detention in a lagoon for storm overflow and plant effluent and chlorination of lagoon effluent prior to discharge to the receiving stream.

The city is now considering a research project to study the effect of industrial waste on the treatability of the sewage and wastes received at the sewage treatment plant. Consideration is also being given to including a request for funds to study phosphate removal in this project. The development of a plant scale project for phosphate removal will depend on the outcome of research by Fort Wayne or other research projects.

Plans and specifications have been approved for sanitary sewers to be installed by a private corporation in the fringe area east of Fort Wayne with discharge to the City of Fort Wayne for treatment. This project would provide sewer service for several industries, subdivisions, and commercial establishments that now discharge inadequately treated sewage and wastes to the Maumee River and tributaries thereto, downstream from Fort Wayne. The petition for a certificate of territorial authority is now pending before the Indiana Public Service Commission.

The plans for abating the discharge of waste lime sludge from the Fort Wayne municipal water works have been completed. Approval and completion of financial arrangements are pending.

New Haven

The city is providing effective operation of its sewage treatment works. Sewer improvements are needed to reduce the overflow from combined sewers during wet weather periods.

Diversified Utilities (Bullerman-Maumee River Plant)

The operation and maintenance of the utility's sewage works has improved. The effluent BOD's and suspended solids have been averaging from 15 to 20 mg/1. Effluent chlorination facilities and a terminal lagoon are provided. Plans have been approved for plant additions to provide treatment capacity for additional sewer connections.

chemist and reestablish the effluent monitoring program started in 1966. The Board will require renewal of the effluent monitoring program and require completion of construction of needed waste control facilities by the end of 1968.

General Plating and Engineering, Inc., Fort Wayne

The company established an effluent monitoring program during 1966 and retained a consultant to design needed plating waste treatment facilities. Plans and specifications for the facilities are to be submitted during April 1967. The Board will require completion of needed facilities by December 1968.

Gladieux Oil Refining, Inc., Fort Wayne

An effluent monitoring program was established during 1966. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

IT&T Federal Laboratories, Fort Wayne

Monroeville

The town is providing effective operation of its sewage works.

Salisbury Division, Dana Corporation, Fort Wayne

The corporation's monitoring program was established during 1953. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

Essex Wire Corporation, Fort Wayne

During February 1967, the corporation completed connection of all wastewater to the Fort Wayne sewerage system and is conducting engineering studies on water reuse. The corporation is providing adequate waste control.

Franke Plating Works, Inc., Fort Wayne

The company has contacted several consulting engineering firms regarding design of needed plating waste treatment facilities. The company is trying to employ a

An effluent monitoring program was established during 1966. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

International Harvester Company, Fort Wayne

The company has connected many additional waste streams to the Fort Wayne sewerage system and is awaiting construction of a sewer to serve the southeast area of the plant. An effluent monitoring program was established during 1966. Significant progress has been made with reductions in BOD, suspended solids, and oil. The Board will require the company to provide adequate waste control by December 1968.

Magnavox Company, Fort Wayne

An effluent monitoring program was established during 1966. The results of the monitoring program and inspections by representatives of the Board show that adequate control is being maintained.

Parrot Packing Co., Inc., Fort Wayne

A partial effluent monitoring program was established during 1966. Negotiations for a sewer connection to an existing plant were initiated more than three years ago. However, no construction timetable has been presented. The Board at its February meeting scheduled a hearing with Parrot on March 10, 1967 -- at the request of the company's attorney, this hearing was postponed to April 5th -- to determine if the company is causing pollution and whether an order should or should not be made ordering the Parrot Packing Co., Inc., to cease and desist from causing or contributing to the pollution of the Maumee River.

Phelps Dodge Copper Products Corp., Indiana Rod & Wire Div., Fort Wayne

An effluent monitoring program was established during 1966. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

Zollner Corporation, Fort Wayne

Adequate waste control is provided. All wastes except cooling waters discharge to the Fort Wayne sewerage system.

Shaw's Dressed Poultry, Grabill

An effluent monitoring program was not required. Inspections by representatives of the Board show that adequate waste control is being maintained.

B. F. Goodrich Company, Woodburn

An effluent monitoring program was established during 1966. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

ST. JOSEPH RIVER BASIN

Avilla

The town is providing effective operation of its sewage works and waste stabilization ponds.

Auburn

P. Miller

The sewage treatment plant improvements have been placed in operation. Effluent chlorination is being provided. Improved treatment capability and effluent chlorination should materially improve the condition of Cedar Creek downstream from the city. The consulting engineering firm is providing supervision of plant operation and laboratory control.

Butler

The city is providing effective operation of its sewage treatment works.

Garrett

The city is providing effective operation of its sewage treatment works. The effluent BOD's average under 15 mg/l. Effluent chlorination will be started not later than April 1, 1967.

Waterloo

The town is providing effective operation of its sewage treatment works; however, the outlying lift station is still not in effective operation. The town has its consulting engineer working on a solution to the problem.

Crane Edmund Corporation, Butler

An effluent monitoring program was established during 1966. Results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

Universal Tool & Stamping Co., Inc., Butler

A partial effluent monitoring program was established during 1966. Results of the monitoring program show that concentrations of cyanide are significant. The company plans to replace the zinc cyanide plating solution with an acid zinc solution. Concentrations of zinc in the effluent will be minimized by use of static rinse tanks. The modifications should be completed during 1967.

Kitchen-Quip, Inc., Waterloo

A partial effluent monitoring program was established during 1966. The results of effluent samples taken by the Board show that concentrations of suspended solids, chromium, and zinc are significant. The company has contacted consultants regarding design of industrial waste treatment and control facilities. The Board will require completion of construction of needed waste control facilities by December 1968.

T. H. Products Corporation, Waterloo

No wastewater is discharged to the receiving stream. Inspections by representatives of the Board show that adequate waste control is provided.

Auburn Tankage Company, Auburn

The company has no waste discharge to the receiving stream. Inspections by representatives of the Board show that adequate waste control is provided.

County Line Cheese Company, Auburn

An effluent monitoring program was established during 1966. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

Warner Motive Division, Borg-Warner Corporation, Auburn

A partial effluent monitoring program was established during 1966. The results of the monitoring program show that concentrations of BOD, oil and suspended solids are significant. Plans and specifications for oil separation facilities and a waste stabilization pond were submitted on March 2, 1967, and were considered satisfactory by the Board at its meeting on March 21, 1967. The Board will require completion of construction of approved facilities by December 1968.

Sechler and Sons, Inc., St. Joe

On July 13, 1966, the Board approved plans and specifications for a waste stabilization pond and brine control facilities for the company. The approved facilities were completed during January 1967. An effluent monitoring program is being established. The newly completed facilities will provide adequate waste control.

ST. MARY'S RIVER BASIN

Berne

The city is providing effective operation and maintenance of its sewage works.

Decatur

The city is providing effective operation and maintenance of its sewage works. Effluent BOD's and suspended solids are averaging from 15 to 20 mg/1.

Central Soya Co., Inc., Decatur

The company established an effluent monitoring program during 1964. The results of the monitoring program and inspections by representatives of the Board show that adequate waste control is being maintained.

CONCLUSIONS

1. The State has made substantial progress towards carrying out the recommendations of the conferees.

2. All municipalities with recognized sewer systems have secondary treatment works in operation.

3. The six municipalities without effluent chlorination facilities will provide them by 1968.

4. Fort Wayne, the largest city in the basin, is pursuing a program for the reduction of nutrients discharged to the stream.

5. All industries which are required to provide effluent monitoring have done so, except Franke Plating Works, Inc.

6. Fifteen of the twenty-two industries have adequate treatment facilities, six have waste treatment projects in the planning stage, and legal action has been initiated against Parrot Packing Co., Inc.

7. The Board will require completion of construction of needed industrial waste treatment facilities by the end of 1968.

This completes our report.

MR. STEIN: Thank you. The entire report will be included in the record, as if read, without objection.

(The charts attached to Mr. Miller's report are as follows:)

ST. MARY'S RIVER, FT. WAYNE—1965

Station STM-12

Date	Laboratory Analyses															Field Tests				Flow
																	Dissolved Oxygen			
	Alkalinity (total) as CaCO₃ mg/liter	Chlorides as Cl— mg/liter	Nitrates as N mg/liter	pH	Spec. Conductance μmhos./cm	Hardness as CaCO₃ mg/liter	Color	Odor—Qualitative	Turbidity	Susp. Matter mg/liter	Vol. Susp. Matter mg/liter	Phosphates	A.B.S.	BOD mg/liter	Coliform per 100 ml.	Temperature—C.°	mg/liter	% Sat.	pH	Flow cfs.
1-13-65	150	61	4.2	8.2	875	346	30	O	30	12	3	1.5	—	2.4	2,100	0	9.6	66	7.6	40
1-26-65	72	22	5.9	7.6	412	212	30	O	190	168	26	0.5	—	4.1	57,000	1	10.8	75	—	900
2-10-65	60	8	2.7	7.9	216	120	5	O	3,000	1,330	184	0.4	—	—	140,000	6	8.1	65	—	3,510
2-24-65	152	42	4.2	7.9	810	378	10	O	20	12	4	0.7	—	—	—	0	9.6	66	7.6	156
3-10-65	72	16	8.2	7.8	318	164	25	O	90	52	12	0.2	—	2.6	6,700	2	8.7	63	7.9	3,570
3-22-65	128	28	7.6	8.2	625	306	10	O	60	30	10	0.4	—	2.0	3,700	2	19.5	139	8.0	—
4- 7-65	78	8	5.5	7.9	284	159	40	O	1,600	870	80	0.3	—	3.6	27,000	10	9.4	83	7.6	3,270
4-21-65	130	23	7.4	8.2	590	286	50	G	130	82	7	0.7	—	2.2	2,700	13	9.0	85	7.3	—
5- 3-65	132	23	6.5	8.3	564	272	25	E	75	65	13	0.4	—	3.8	2,000	16	6.7	67	—	545
5-19-65	190	49	0.4	8.3	980	394	30	O	80	60	22	0.5	—	8.3	500	21	12.4	138	8.0	62
6- 4-65	180	35	4.8	7.6	—	336	30	M	400	233	28	0.6	—	2.8	19,000	19	88.9	96	7.4	82
6-16-65	194	57	0.0	8.3	479	398	20	O	100	111	18	0.5	—	6.7	1,000	21	11.0	122	8.0	43
6-30-65	156	55	0.8	8.4	778	312	25	O	70	58	22	0.5	—	6.7	700	24	11.0	129	8.1	25
7-13-65	218	71	3.2	8.8	916	370	20	E	120	108	26	0.6	—	8.3	6,000	25	8.5	100	8.1	24
7-28-65	230	100	0.8	8.1	—	442	20	B	150	81	14	3.1	—	3.3	1,100	28	8.8	112	7.8	20
8-12-65	222	93	0.1	8.5	1,062	406	25	O	110	138	42	0.6	—	12.0	900	23	8.9	103	7.6	23
8-26-65	207	108	0.3	8.1	973	388	20	M	100	74	10	1.2	—	4.0	15,000	24	9.1	107	7.8	19
9- 9-65	182	106	0.1	8.2	1,055	386	10	O	100	89	23	1.0	—	4.7	1,800	21	9.4	104	7.6	23
9-23-65	146	98	1.0	8.2	941	342	20	M	100	78	16	0.6	—	6.7	15,000	22	9.1	103	7.6	37
10- 4-65	80	35	2.9	8.5	683	288	35	O	20	17	10	1.7	—	2.5	80,000	15	8.1	80	—	21
10-21-65	246	62	0.2	7.6	706	308	30	O	70	31	19	2.7	—	10.0	11,000,000	17	1.5	15	—	56
11- 3-65	178	67	1.4	7.8	883	356	35	E	50	50	5	1.2	—	3.1	1,400	12	10.5	97	7.6	37
11-17-65	166	59	1.5	8.0	960	350	25	O	50	26	13	1.8	—	6.1	35,000	8	8.0	73	—	28
12- 2-65	200	75	1.2	8.4	1,009	408	20	E	100	39	22	0.9	—	8.0	2,500	0	17.8	122	8.0	30
12-16-65	156	53	8.0	7.9	778	332	30	B	70	26	12	1.1	—	3.4	11,000	2	11.8	86	7.6	112
12-30-65	184	52	6.5	7.6	893	360	—	C	20	25	8	1.5	—	2.9	6,800	2	12.2	88	7.6	77
Min.	60	8	0.0	7.6	216	120	5		20	12	3	0.3		2.0	500		1.5	15	7.3	
Max.	246	108	8.2	8.8	1062	442	50		3000	1330	184	3.1		12.0	11,000,000		19.5	139	8.1	
Ave.	158	54	3.5	7.8	741	324	25		265	149	25	1.0		5.0	6,000*		13.0	92	7.7	

*Median Value

ST. MARY'S RIVER, FT. WAYNE - 1966 Station STM-12

DATE	LABORATORY ANALYSIS															FIELD TESTS				FLOW
																	DISSOLVED OXYGEN			
	ALKALINITY (TOTAL) AS $CaCO_3$ MG/LITER	CHLORIDES AS CL- MG/LITER	NITRATES AS N MG/LITER	pH	SPEC. CONDUCTANCE μ MHOS./ 1CM	HARDNESS AS $Ca\ CO_3$ MG/LITER	COLOR	ODOR. QUALITATIVE	TURBIDITY	SUSP. MATTER MG/LITER	VOL. SUSP. MATTER MG/LITER	PHOSPHATES	A.B.S.	BOD MG/LITER	COLIFORM PER 100 ML.	TEMPERATURE - C°	MG/LITER	% SAT.	pH	FLOW CFS.
1 11 66			•	•										•	RIVER		•		•	FROZEN
1 12 66	174	37	1.2	7.9	815	388	40	CH	25	16	5	2.8		2.6	9700		15.0	103	7.8	200
1 27 66			•	•										•	RIVER		•		•	FROZEN
2 10 66	184	72	1.6	7.5	963	380	20	M	20	23	7	1.8		5.7	100		12.9	88	7.4	500
2 24 66	168	41	8.3	7.5	815	342	20	M	5	19	5	.8		3.2	3200		14.3	98	7.4	168
3 10 66	162	36	9.0	7.7	706	342	15	M	35	32	7	.9		2.3	2700	4	12.8	97	7.8	270
3 24 66	162	32	5.7	7.5	664	340	20	00	100	75	11	.6		3.5	7900	5	9.9	77	8.0	300
4 6 66	192	43	5.5	8.0	815	400	5	00	5	24	13	.6		4.1	200	7	13.5	111	8.0	88
4 21 66	208	65	.2	8.5	1042	406	15	00	40	56	32	.8		6.7	4000	16	11.0	111	8.2	55
5 5 66	142	26	5.3	7.5	642	298	40	E	90	67	14	.8		3.0	9400	13	10.7	101	7.0	545
5 19 66	168	27	5.6	7.5	706	336	20	M	50	109	16	.4		1.7	5400	13	8.6	82	7.5	545
6 3 66	220	45	3.4	8.0	877	430	15	M	50	63	16	.4		11.0	4400	17	15.3	157	7.4	88
6 16 66	216	62	.5	7.6	995	436	20	MM	100	100	30	.9		7.7	200	23	13.5	156	7.3	156
6 30 66	194	77	.8	7.4	824	390	25	E	60	29	1	1.0		3.7	700	29	4.5	58	7.4	35
7 14 66	168	21	5.4	7.2	531	268	35	E	270	122	19	1.3		3.9	220000	28	7.4	93	7.8	77
7 29 66	234	122	.3	7.4	1098	404	25	00	180	130	23	1.1		5.3	190000	28	6.3	80	7.4	23
8 11 66	208	9	.8	7.4	1152	400	15	M	100	100	32	1.6		13.0	210000	20	9.8	107	7.2	30
8 25 66	202	105	.4	7.9	1090	370	15	G	100	98	27	1.1		10.0	230000	21	9.6	107	7.6	18
9 9 66	232	146	•	7.6	1317	454	20	00	150	89	19	1.1		6.0	150000	17	7.6	78	7.4	15
9 22 66	172	97	.6	7.9	1058	360	20	00	140	110	28	24		4.1	290000	17	6.5	67	7.8	62
10 6 66	200	90	.9	8.1	1151	414	10	00	40	61	25	1.1		9.0	28000	13	15.5	147	8.4	14
10 19 66	212	129	.8	7.9	1249	424	15	00	50	42	5	1.8		7.1	1300	7	8.8	73	7.0	20
11 3 66			•	•										•	CLOSE		•		•	ROAD
11 16 66	132	47	5.9	7.3	656	292	25	M	40	20	2	.7		2.9	62000	6	9.2	74	7.3	243
12 1 66	148	40	6.3	7.2	671	320	35	00	60	38	6	.5		15.0	23000		11.9	81	7.2	613
12 15 66	80	12	5.0	6.6	337	184	40	00	100	24	4	.1		2.8	30000		11.4	78	6.6	4730
12 30 66	202	62	5.3	7.9	847	410	15	M	20	10	4	1.[illegible]		3.4	66000		12.4	85	7.8	
Min.	80	9	0.3	6.6	337	184	5		5	10	1	0.1		1.7	100		4.5	58	6.6	
Max.	234	146	9.0	8.5	1317	454	40		270	130	30	2.8		15.0	220,000		15.5	157	8.4	
Ave.	188	60	3.3	7.6	876	366	20		76	60	15	1.1		5.7	7,900*		10.8	96	7.5	

*Median Value

ST. JOSEPH RIVER (Maumee River Basin), FT. WAYNE—1965 Station STJ-8

Date	Laboratory Analyses															Field Tests				Flow
																	Dissolved Oxygen			
	Alkalinity (total) as $CaCO_3$ mg/liter	Chlorides as Cl— mg/liter	Nitrates as N mg/liter	pH	Spec. Conductance µmhos./cm	Hardness as $CaCO_3$ mg/liter	Color	Odor—Qualitative	Turbidity	Susp. Matter mg/liter	Vol. Susp. Matter mg/liter	Phosphates	A.B.S.	BOD mg/liter	Coliform per 100 ml.	Temperature—C.°	mg/liter	% Sat.	pH	Flow cfs.
1-13-65	166	27	6.8	8.3	767	392	35	O	30	9	2	0.4	—	4.2	6,600	0	8.2	56	7.8	538
1-26-65	88	18	7.2	7.4	528	278	40	O	120	94	30	0.4	—	2.8	51,000	2	10.7	77	—	1,480
2-10-65	90	9	5.0	7.9	273	366	5	O	1500	816	84	0.0	—	—	180,000	6	7.5	60	—	5,180
2-24-65	138	14	2.5	7.8	634	280	20	O	20	21	6	0.5	—	—	—	—	—	—	—	385
3-10-65	78	10	4.5	7.9	319	160	50	O	100	52	8	0.3	—	2.2	18,000	1	8.8	61	—	4,780
3-22-65	130	18	4.2	8.1	547	264	40	O	25	20	5	0.2	—	2.1	7,300	2	20.6	144	—	1,260
4- 7-65	90	10	5.0	8.0	394	200	50	O	450	256	24	0.2	—	4.3	24,000	9	10.4	90	—	3,670
4-22-65	150	17	3.2	8.2	556	282	50	O	80	53	8	0.4	—	2.4	3,600	11	11.0	99	—	1,260
5- 3-65	174	13	2.4	8.3	564	306	40	M	75	53	10	0.3	—	3.7	10,000	16	6.5	65	—	890
5-20-65	220	15	1.5	8.3	674	362	50	O	30	32	7	0.4	—	3.3	2,800	19	9.0	96	—	339
6- 3-65	228	16	0.9	8.2	—	344	30	O	25	43	18	0.4	—	3.2	7,600	19	10.4	111	7.8	301
6-16-65	248	19	0.1	8.2	612	368	20	M	20	23	7	0.4	—	2.7	700	20	6.7	73	7.9	165
7- 1-65	258	20	0.0	8.3	689	344	20	O	25	23	13	0.3	—	2.1	200	21	9.1	101	8.0	127
7-12-65	256	17	0.4	8.4	642	338	15	Mn	30	30	8	0.4	—	1.4	300	25	10.0	119	8.0	109
7-28-65	229	15	1.2	8.3	—	332	30	B	90	51	10	0.5	—	4.2	2,000	28	9.1	115	8.1	105
8-11-65	229	16	1.1	8.3	577	276	25	M	50	46	17	0.5	—	2.1	1,000	24	8.1	95	7.8	81
8-26-65	268	17	0.4	8.2	592	340	15	O	40	31	10	0.4	—	1.9	<100	23	7.8	90	7.7	97
9-10-65	202	15	0.1	8.2	417	390	20	O	30	28	7	0.4	—	2.5	3,000	20	8.4	91	7.6	136
9-22-65	166	13	2.9	8.0	564	290	40	O	100	65	3	0.3	—	1.7	9,400	22	7.5	85	7.6	257
10- 4-65	178	19	1.6	8.2	683	338	5	Mm	30	25	11	0.1	—	2.9	10,000	12	9.6	88	—	128
10-21-65	248	18	0.4	8.0	645	358	25	O	70	30	5	0.5	—	2.8	3,600	17	8.5	87	—	218
11- 3-65	208	28	4.9	8.1	730	394	50	O	30	25	8	1.0	—	1.7	1,500	11	11.1	100	7.7	261
11-16-65	232	17	1.3	8.4	800	382	40	O	50	23	3	0.7	—	2.9	4,500	10	9.8	87	—	303
12- 1-65	200	16	2.4	7.7	642	340	80	O	100	57	17	0.6	—	3.0	19,000	2	12.5	91	7.6	475
12-15-65	120	15	7.8	7.7	491	248	70	O	110	60	30	1.0	—	5.0	80,000	4	11.0	84	7.2	2,750
12-29-65	92	8	4.0	7.5	347	164	—	O	230	170	30	0.4	—	3.4	13,000	1	13.5	94	7.2	6,400
Min.	78	8	0.0	7.4	273	164	5		20	9	2	0.0		1.4	100		6.5	56	7.2	
Max.	258	28	7.8	8.4	767	394	70		1500	816	84	1.0		5.0	180,000		20.6	144	8.1	
Ave.	180	16	3.0	7.9	570	312	35		95	82	15	0.4		2.8	6,600*		9.8	90	7.7	

*Median Value

ST. JOSEPH RIVER (Maumee River Basin), FT. WAYNE - 1966 Station STJ-8

DATE	LABORATORY ANALYSIS															FIELD TESTS				FLOW
																	DISSOLVED OXYGEN			
	ALKALINITY (TOTAL) AS CaCO₃ MG/LITER	CHLORIDES AS Cl- MG/LITER	NITRATES AS N MG/LITER	pH	SPEC. CONDUCTANCE µ MHOS./ CM	HARDNESS AS CaCO₃ MG/LITER	COLOR	ODOR-QUALITATIVE	TURBIDITY	SUSP. MATTER MG/LITER	VOL. SUSP. MATTER MG/LITER	PHOSPHATES	A.B.S.	BOD MG/LITER	COLIFORM PER 100 ML.	TEMPERATURE - C°	MG/LITER	% SAT.	pH	FLOW CFS.
1 12 66	210	13	3.2	7.9	623	354	40	0	25	16		.2		1.9	15000		14.3	98	7.9	750
1 26 66			.	.										.	RIVER		.		.	FROZEN
2 9 66	242	26	1.0	7.6	706	374	20	E	10	12	5	1.7		2.5	97000	1	12.5	87	7.2	330
2 23 66	222	15	8.3	6.9	683	364	25	0	15	14	4	.4		2.5	700		12.9	88	7.4	441
3 9 66	192	18	2.2	7.8	588	308	30	00	20	21	6	.3		1.4	900	3	12.7	94	7.6	590
3 23 66	112	15	2.3	7.5	611	342	25	00	50	44	8	.3		1.8	3300	10	11.1	98	7.2	815
4 5 66	204	14	1.8	7.6	642	334	20	00	15	24	9	.2		2.1	8100	6	11.7	94	7.6	676
4 20 66	226	51	1.0	7.9	663	342	20	00	30	29	14	.2		3.5	4000	18	7.8	82	7.9	414
5 5 66	192	13	2.9	7.7	557	306	50	00	80	38	10	.5		1.8	2500	14	11.8	114	7.7	913
5 18 66	160	11	3.0	7.5	504	274	50	00	60	58	8	.4		4.5	7600	14	8.8	85	7.4	2821
6 2 66	224	14	1.9	7.2	679	380	25	00	30	21	6	.3		2.9	130000	16	9.5	96	7.5	335
6 15 66	262	17	.7	7.7	674	358	15	00	60	36	5	.5		1.6	3000	21	8.7	98	7.2	204
6 29 66	242	16	.8	7.3	542	350	25	00	90	45	10	.4		4.3	1300	28	6.8	86	7.8	280
7 13 66	184	14	2.4	7.2	546	272	35	E	250	216	36	.5		6.7	48000	27	6.5	80	7.8	905
7 28 66	240	52	1.6	7.7	599	348	20	00	50	31	3	.3		3.0	14000	28	6.9	87	7.4	87
8 10 66	230	18	.5	7.6	663	314	20	M	40	27	4	.2		4.7	2200	22	8.4	94	7.2	87
8 27 66	264	19	.5	7.8	676	334	10	00	40	36	11	.5		2.9	120000	22	8.4	95	7.4	85
9 8 66	220	17	.1	7.6	618	302	15	00	170	183	33	.6		6.3	1200	20	8.5	92	7.6	79
9 21 66	232	20	.1	8.0	607	320	10	00	40	26		.4		2.0	6700	18	8.5	89	7.2	64
10 5 66	66	34	.9	8.5	509	160	10	00	10	11	6	.5		5.2	400	12	10.8	99	7.8	63
10 19 66	286	27	.1	7.8	736	360	5	00	15	13	3	.8		3.6	700	9	10.1	87	7.1	75
11 2 66	284	22	.0	8.1	751	340	10	00	10	16	7	.4		5.0	500	4	10.2	78	.	78
11 16 66	156	24	7.0	7.6	635	318	50	00	40	28	4	.3		2.1	6900	7	11.7	96	7.6	412
11 30 66	192	20	3.4	7.4	643	344	50	00	50	28	9	.7		3.3	160000	2	12.3	89	6.2	665
12 14 66	94	11	5.7	6.5	373	196	70	00	90	49	9	.1		2.9	24000		12.0	82	6.5	5990
12 29 66	200	16	3.2	8.0	582	330	30	00	15	13	4	.3		2.8	6000		15.9	109	7.9	681
Min.	66	11	.0	6.5	373	160	5		10	11	0	0.1		1.4	400		6.5	78	6.2	
Max.	286	52	8.3	8.5	751	380	70		250	216	36	1.7		6.7	160,000		14.3	114	7.9	
Ave.	205	26	2.2	7.6	616	320	25		52	41	9	0.4		3.2	6,000*		10.7	92	7.4	

*Median Value

MAUMEE RIVER, NEW HAVEN—1965

Station M-110

	Laboratory Analyses															Field Tests				Flow
																	Dissolved Oxygen			
Date	Alkalinity (total) as CaCO₃ mg/liter	Chlorides as Cl— mg/liter	Nitrates as N mg/liter	pH	Spec. Conductance µmhos./cm	Hardness as CaCO₃ mg/liter	Color	Odor—Qualitative	Turbidity	Susp. Matter mg/liter	Vol. Susp. Matter mg/liter	Phosphates	A.B.S.	BOD mg/liter	Coliform per 100 ml.	Temperature—C.°	mg/liter	% Sat.	pH	Flow cfs.
1-13-65	186	36	5.4	8.2	770	350	30	O	40	24	9	1.3	—	10.0	130,000	0	8.4	58	7.3	384
1-26-65	88	23	5.6	7.6	493	272	30	O	210	150	28	0.5	—	5.3	140,000	2	11.1	81	—	3,280
2-10-65	174	11	3.1	8.5	329	288	5	O	1,500	1,720	264	0.5	—	—	270,000	6	7.9	63	—	8,630
2-24-65	160	25	5.9	7.9	706	338	30	O	20	24	8	1.4	—	—	—	0	7.1	49	7.4	521
3-10-65	86	14	8.2	8.5	324	164	50	O	150	77	15	0.3	—	3.7	32,000	1	8.6	60	8.1	9,300
3-22-65	130	22	5.4	8.1	534	277	40	O	20	17	6	0.4	—	3.8	32,000	3	8.6	63	7.9	1,920
4- 7-65	86	10	5.0	8.0	320	183	40	O	1,400	812	76	0.3	—	12.0	50,000	9	11.3	98	—	7,910
4-21-65	148	18	4.4	8.2	581	288	60	G	100	67	8	0.5	—	3.3	59,000	12	10.4	96	7.6	—
5- 3-65	156	16	3.8	8.3	564	284	30	Mm	75	53	11	0.7	—	3.7	15,000	16	6.8	68	—	1,790
5-19-65	204	25	1.7	8.2	720	340	50	Mm	30	31	10	2.1	—	4.7	11,000	22	7.5	85	7.9	493
6- 4-65	210	26	2.8	7.8	—	330	30	C	30	50	14	3.3	—	5.1	280,000	17	6.3	76	7.6	376
6-16-65	216	35	0.0	7.8	561	378	20	O	20	17	7	4.5	—	6.3	590,000	23	5.2	60	7.6	232
7- 1-65	228	39	1.0	8.1	773	342	25	M	15	14	7	3.2	—	2.5	260,000	25	7.1	85	—	160
7-13-65	176	38	4.5	8.0	648	282	20	Mm	10	24	12	6.0	—	4.3	29,000	25	6.6	79	7.8	126
7-28-65	191	38	3.6	8.2	—	268	25	M	20	24	9	6.5	—	4.0	10,000	27	4.8	60	7.6	160
8-12-65	227	54	1.8	8.1	806	328	20	O	20	24	9	2.5	—	3.3	—	25	6.5	78	7.6	110
8-26-65	227	43	1.3	8.5	672	304	20	O	10	9	4	4.0	—	3.0	—	25	8.1	96	7.3	139
9- 9-65	200	43	2.3	7.9	521	316	25	O	30	34	21	2.8	—	4.1	13,000	21	7.8	87	7.5	205
9-23-65	152	27	3.4	8.8	611	292	40	O	100	68	6	0.7	—	2.9	250,000	21	7.4	82	7.1	334
10- 4-65	188	39	3.4	8.1	730	300	5	Mm	20	23	12	2.7	—	3.8	80,000	15	6.8	67	—	195
10-21-65	206	44	0.8	7.7	729	350	25	O	40	22	7	1.9	—	8.6	560,000	18	5.1	52	—	385
11- 3-65	98	30	4.6	7.9	756	362	50	Mm	30	35	12	1.7	—	5.2	480,000	13	8.3	79	7.5	320
11-16-65	240	28	1.1	8.1	800	356	30	M	40	22	12	2.3	—	19.0	720,000	12	6.1	56	—	340
12- 1-65	232	26	2.1	7.8	706	350	40	O	90	36	15	1.3	—	4.8	130,000	2	12.5	91	7.6	510
12-16-65	124	18	6.4	7.5	525	280	50	O	140	87	37	0.7	—	5.0	71,000	4	12.2	92	7.6	2,500
12-29-65	100	10	4.7	7.4	368	176	—	G	250	311	38	0.5	—	4.8	35,000	1	13.5	94	7.8	6,400
Min.	86	10	0.0	7.4	320	176	5		10	9	4	0.3		2.5	10,000		5.1	49	7.1	
Max.	240	54	8.2	8.8	806	378	60		1400	812	264	6.5		19.0	720,000		13.5	98	8.1	
Ave.	170	28	3.7	7.8	606	300	30		170	141	25	2.0		5.5	80,000		8.1	75	7.6	

*Median Value

MAUMEE RIVER, NEW HAVEN - 1966 Station M-110

DATE	LABORATORY ANALYSIS															FIELD TESTS				FLOW
	ALKALINITY (TOTAL) AS $CaCO_3$ MG/LITER	CHLORIDES AS CL- MG/LITER	NITRATES AS N MG/LITER	pH	SPEC. CONDUCTANCE µ MHOS./CM	HARDNESS AS $CaCO_3$ MG/LITER	COLOR	ODOR-QUALITATIVE	TURBIDITY	SUSP. MATTER MG/LITER	VOL. SUSP. MATTER MG/LITER	PHOSPHATES	A.B.S.	BOD MG/LITER	COLIFORM PER 100 ML.	TEMPERATURE - C°	DISSOLVED OXYGEN MG/LITER	DISSOLVED OXYGEN % SAT.	pH	FLOW CFS.
1 12 66	200	18	4.8	8.0	642	330	50	0	30	39	23	.8		3.9	48000		12.1	85	8.0	942
1 12 66	236	36	1.9	7.9	746	364	20	00	15	16	5	1.3		3.9	52000		12.4	85	7.9	
1 26 66	266	22	1.9	7.8	784	396	25	G	10	9	4	.8		3.3	31000	1	13.4	94	7.4	666
2 9 66	208	55	1.6	7.8	921	432	15	MM	15	16	6	2.0		4.5	130000	5	10.8	84	7.4	414
2 23 66	198	25	4.3	7.8	683	340	25	M	15	18	6	1.0		3.4		1	14.0	98	7.6	749
3 9 66	180	22	4.4	7.7	642	402	25	M	25	27	7	1.2		3.3	19000	4	12.5	95	7.4	1030
3 23 66	194	26	3.3	7.5	664	352	25	00	40	53	15	1.5		7.7	10000	10	6.7	59	7.2	1280
4 5 66	206	21	2.6	7.6	683	344	25	00	20	30	15	1.2		2.8	2700	7	10.7	88	7.5	722
4 20 66	216	29	1.0	7.6	211	342	25	00	30	35	17	2.3		6.0	100000	18	7.8	81	7.[illegible]	464
5 5 66	186	18	4.8	7.5	557	306	40	00	90	57	16	.8		3.6	1000	14	11.5	111	7.4	1570
5 18 66	150	14	5.5	7.4	533	264	40	00	90	68	13	.6		.7	45000	14	8.5	82	7.4	3770
6 2 66	230	28	2.7	7.6	726	356	25	M	35	42	18	1.5		11.0	12000	19	14.7	157	7.2	460
6 15 66	202	37	.5	7.2	696	294	20	M	80	39	13	2.5		6.3	200000	22	3.2	36	7.3	328
6 29 66	214	35	1.2	7.0	597	310	25	E	30	12	10	2.5		2.7	13000	27	2.0	25	7.0	482
7 13 66	170	54	4.5	7.5	748	310	25	E	170	164	35	.9		3.7	2400	27	6.0	74	7.6	1340
7 28 66	202	39	.7	7.1	637	282	30	00	30	17	4	4.0		6.0	230000	28	1.6	21	7.2	173
8 10 66	198	53	1.2	7.2	591	276	20	M	15	15	1	4.7		5.0	340000	23	1.7	20	7.0	105
8 24 66	190	42	1.6	7.0	654	274	20	M	35	25	13	5.3		4.7	58000	23	4.5	52	7.0	135
9 8 66	220	38	.3	7.5	746	280	20	E	10	13	3	6.5		2.4	4800	26	4.3	53	7.2	114
9 21 66	200	74	.3	7.7	835	316	25	E	20	10	8	3.4		8.0	320000	20	1.8	19	5.6	179
10 5 66	228	74	1.1	7.6	995	280	20	00	5	11	10	5.6		6.1	390000	15	3.0	30	7.2	101
10 19 66	216	60	.9	7.4	763	302	15	00	20	9	2	6.5		2.3	5200	12	2.9	27	6.7	96
11 2 66			•	•										•	CLOSED		•		•	ROAD
11 16 66	154	38	6.3	7.4	678	310	50	M	40	36	2	1.4		5.3	490000	8	10.0	84	7.4	820
11 30 66	152	49	5.6	7.4	662	282	35	00	60	34	11	1.1		6.2		3	10.2	75	7.3	1400
12 14 66	90	12	5.2	6.6	343	234	50	00	130	87	19	.1		3.2	66000		11.3	77	6.6	13800
12 29 66	198	32	4.3	8.0	728	370	35	00	20	24	8	.8		2.8	20000		15.4	106	7.6	1090
Min.	90	12	.3	6.6	211	280	15		5	9	1	0.1		2.3	2,700		1.6	19	5.6	
Max.	266	55	6.3	8.0	995	432	50		170	164	35	6.5		11.0	3,900,000		15.4	157	8.0	
Ave.	195	37	2.8	7.5	668	320	30		45	36	11	2.4		4.6	100,000*		8.0	69	7.2	

*Median Value

MAUMEE RIVER, WOODBURN—1965

Station M-95

	Laboratory Analyses															Field Tests				Flow
																	Dissolved Oxygen			
Date	Alkalinity (total) as CaCO, mg/liter	Chlorides as Cl— mg/liter	Nitrates as N mg/liter	pH	Spec. Conductance μmhos./cm	Hardness as CaCO, mg/liter	Color	Odor—Qualitative	Turbidity	Susp. Matter mg/liter	Vol. Susp. Matter mg/liter	Phosphates	A.B.S.	BOD mg/liter	Coliform per 100 ml.	Temperature—C.°	mg/liter	% Sat.	pH	Flow cfs.
1-13-65	168	39	6.0	8.2	742	336	25	O	30	17	7	1.7	—	6.3	29,000	0	10.1	69	7.5	—
1-26-65	98	23	5.9	7.6	477	252	30	O	230	194	38	0.6	—	5.0	92,000	2	10.7	77	—	—
2-10-65	248	13	2.9	8.5	335	360	5	O	2,500	1,780	264	0.5	—	—	220,000	6	7.0	56	—	—
2-24-65	154	25	5.1	7.8	684	318	30	O	20	19	4	1.2	—	—	—	0	8.0	55	7.5	—
3-10-65	76	14	4.9	7.9	309	162	50	O	160	79	15	0.1	—	2.4	31,000	1	8.8	61	7.6	—
3-22-65	127	21	5.3	8.1	521	266	40	M	30	36	8	0.4	—	3.0	7,700	2	20.1	144	—	—
4- 7-65	92	11	4.8	7.9	341	194	35	O	800	744	68	0.4	—	3.9	61,000	8	10.3	87	7.4	—
4-21-65	148	18	4.4	8.2	573	288	60	G	100	61	12.	0.6	—	2.7	35,000	12	10.0	92	7.6	—
5- 3-65	150	18	4.2	8.3	550	280	40	M	80	61	13	0.8	—	3.7	12,000	16	5.8	58	—	—
5-19-65	222	27	2.0	8.2	733	344	50	O	50	33	13	1.9	—	5.1	38,000	23	7.7	89	—	—
6- 4-65	198	26	3.7	7.6	—	332	30	M	100	88	20	1.4	—	3.7	77,000	18	5.7	58	7.4	—
6-16-65	212	32	2.5	8.0	571	370	20	M	80	68	17	2.4	—	6.4	33,000	21	11.0	122	7.8	—
7- 1-65	232	55	2.6	8.2	851	364	30	O	90	56	20	6.5	—	5.0	2,700	24	8.2	96	7.6	—
7-13-65	204	45	1.9	8.3	713	312	20	Mm	100	73	22	3.5	—	2.5	4,800	25	10.6	126	7.8	—
7-28-65	180	28	2.0	8.4	—	268	20	M	50	39	14	2.6	—	4.9	6,000	27	6.8	84	7.6	—
8-12-65	212	48	2.6	8.4	760	332	30	M	40	54	22	3.0	—	4.7	2,800	25	6.8	81	7.2	—
8-26-65	217	50	3.3	8.2	689	320	20	O	60	35	10	4.3	—	3.2	—	25	7.8	93	7.6	—
9- 9-65	198	38	3.2	8.2	521	316	25	O	—	49	9	2.1	—	3.7	—	22	7.8	88	7.4	—
9-22-65	146	27	3.1	7.9	611	278	50	O	100	78	7	1.8	—	2.4	94,000	22	7.3	82	7.5	—
10- 4-65	80	35	2.9	8.5	683	288	35	O	20	17	10	1.7	—	2.5	120,000	15	8.2	81	—	—
10-21-65	212	51	3.3	7.5	729	352	30	O	25	26	8	6.9	—	5.9	310,000	17	5.3	54	—	—
11- 3-65	166	32	3.4	7.6	784	362	50	O	30	29	8	1.3	—	3.2	32,000	13	9.2	87	8.1	—
11-16-65	230	30	2.7	8.2	857	370	35	O	35	22	8	1.8	—	4.1	24,000	12	9.7	89	—	—
12- 1-65	220	28	2.1	7.8	706	364	40	O	90	30	15	1.8	—	5.4	30,000	2	14.2	102	7.6	—
12-16-65	126	19	7.8	7.7	502	272	80	O	150	52	37	1.4	—	4.9	83,000	4	12.2	92	7.8	—
12-29-65	100	10	4.5	7.4	357	178	—	G	260	239	42	0.5	—	4.6	41,000	1	12.5	87	7.8	—
Min.	76	10	1.9	7.4	309	162	5		20	17	4	0.1		2.4	2,700		5.3	54	7.2	
Max.	248	55	7.8	8.5	857	370	80		800	744	68	6.9		6.4	310,000		20.1	144	8.1	
Ave.	170	29	3.9	7.8	608	302	35		35	88	18	2.0		4.1	33,000*		9.3	86	7.6	

*Median Value

MAUMEE RIVER, WOODBURN - 1966

Station M-95

DATE	LABORATORY ANALYSIS																FIELD TESTS			FLOW
	ALKALINITY (TOTAL) AS CaCO₃ MG/LITER	CHLORIDES AS Cl- MG/LITER	NITRATES AS N MG/LITER	pH	SPEC. CONDUCTANCE µ MHOS./ 1CM	HARDNESS AS Ca CO₃ MG/LITER	COLOR	ODOR-QUALITATIVE	TURBIDITY	SUSP. MATTER MG/LITER	VOL. SUSP. MATTER MG/LITER	PHOSPHATES	A.B.S.	BOD MG/LITER	COLIFORM PER 100 ML.	TEMPERATURE - C°	DISSOLVED OXYGEN MG/LITER	DISSOLVED OXYGEN % SAT.	pH	FLOW CFS.
1 12 66			•	•										•	RIVER		•		•	FROZEN
1 26 66	256	33	2.7	7.7	847	408	25	G	15	14	6	2.2		4.8	61000		11.8	80	7.2	
2 23 66	176	28	8.9	7.6	683	358	25	M	15	21	9	1.5		2.7	1000	2	12.2	88	7.6	
3 9 66	178	26	4.0	7.7	642	314	25	M	35	47	12	1.5		2.6	4900	5	13.1	103	7.4	
3 23 66	192	26	3.5	7.5	664	362	25	00	120	101	22	1.5		7.0	130000	10	8.3	74	7.2	
4 5 66	208	24	3.3	7.5	662	350	20	00	40	58	18	1.4		3.4	24000	6	10.5	84	7.5	
4 20 66	204	26	1.2	8.0	706	362	25	G	20	34	16	1.7		5.3	7000	17	8.4	86	8.0	
5 4 66	170	20	5.4	7.4	605	306	40	E	100	71	16	.9		4.7	32000	14	9.5	92	7.4	
5 18 66	156	15	5.3	7.5	543	280	35		80	86	15	.6		7.7	94000	14	8.1	78	7.4	
6 2 66	226	24	2.6	7.9	726	384	25	E	50	49	11	1.4		10.0	200000	20	14.5	158	7.2	
6 15 66	234	35	1.3	7.4	746	356	20	E	100	70	36	3.1		5.2	32000	22	6.0	68	7.4	
6 29 66	224	48	2.3	7.2	665	320	25	E	60	50	12	7.2		3.7	18000	29	4.9	64	7.2	
7 13 66	136	22	5.2	7.1	481	222	25	E	450	234	34	1.3		1.3	450000	27	3.2	39	7.4	
7 28 66	200	38	3.0	7.6	618	310	25	00	60	54	10	4.2		3.9	100000	28	6.8	86	7.2	
8 10 66	210	58	1.7	7.6	842	310	20	M	40	33	11	4.5		4.8	3000	22	8.0	91	7.0	
8 24 66	188	36	1.8	7.5	665	280	15	MM	50	47	11	3.5		3.9	12000	25	8.6	102	7.3	
9 8 66	218	41	.7	8.2	732	306	20	00	20	26		4.5		7.2	13000	23	15.6	180	8.0	
9 21 66	212	62	.6	7.8	835	326	20	M	20	21		5.5		4.3	120000	19	5.5	59	6.4	
10 5 66	280	59	2.7	7.7	912	312	15	00	10	8	8	6.0		5.5	5000	14	8.0	77	7.4	
10 20 66	194	58	.5	7.9	793	290	15	00	20	17	4	5.7		5.6	4200	11	7.0	63	7.2	
11 2 66			•	•										•	CLOSED		•		•	ROAD
11 16 66	150	37	6.5	7.4	656	300	30	C	40	31	3	1.3		4.2	25000	8	10.6	89	7.5	
11 30 66	152	38	5.6	7.3	626	290	50	00	105	50	10	1.9		5.3	64000	2	10.5	76	6.2	
12 14 66	88	12	4.5	6.6	343	178	50	00	120	82	15	.1		3.1	43000		11.2	76	6.7	
12 29 66	202	43	4.2	7.9	776	346	30	00	15	14	7	1.4		9.0	230000		15.6	107	7.7	
Min.	88	12	.5	6.6	343	178	15		10	8	0	0.1		2.6	1,000		3.2	39	6.2	
Max.	256	62	8.9	8.2	847	408	50		450	234	36	6.0		10.0	450,000		15.6	180	9.0	
Ave.	194	35	3.4	7.5	685	316	25		70	53	12	2.7		5.0	32,000*		9.5	88	7.3	

*Median Value

LAKE ERIE - WATER QUALITY
SUPPLEMENTAL DATA

Date	Thres. Odor	T. Chrome	SO_4	Oils	Fe	Fl	Phenol	NH_3	CN	Mn	Na	K	Cu	Zn	COD	Organic Nitrogen mg/l
Maumee River - Woodburn (Ind. Hwy 101)																
1965																
Min.	1.0	0	100	0	0.3	0	.004	.08	.06	0	3	4	.01	.02	16	0.04
Max.	64.0	.04	250	34.0	32.0	1.90	.018	,70	.12	.20	46	7	.06	.58	100	2.50
Ave.	15.3	.02	130	8.4	3.7	0.85	.010	.37	.06	.08	27	5	.02	.12	37	1.63
1966																
Min.	1.0	.01	60	0.2	0.3	0.05	0	0.2	.06	0	4	3	.02	0.03	18	.56
Max.	16.0	.20	150	44.0	3.5	1.60	.080	2.5	.14	.40	64	8	.10	3.40	36	.95
Ave.	5.6	.04	110	5.7	1.2	0.60	.011	1.0	.07	.12	27	5	.03	0.22	28	.76

LEGEND

Thres. Odor	Threshold Odor - units	Mn	Manganese - mg/l
T. Chrome	Total Chrome - mg/l	Na	Sodium - mg/l
SO_4	Sulfate - mg/l	K	Potassium - mg/l
Fe	Iron - mg/l	Zr	Zinc - mg/l
Fl	Fluoride - mg/l	Cu	Copper - mg/l
NH_3	Ammonia - mg/l	COD	Chemical Oxygen Demand - mg/l
CN	Cyanide - mg/l		

MR. STEIN: Are there any comments or questions?

Let me ask you just one, Mr. Miller.

MR. MILLER: Go ahead.

MR. STEIN: This is an excellent report, and I do think it gives substantial progress.

Let's look at this, for example, on Page 6. For Decatur you state, "Effluent BOD's and suspended solids are averaging from 15 to 20 mg/1," and then in some cities you don't have that. Why do you list it in some and not in others?

MR. MILLER: Well, in some we have better reporting than we do in others.

Some of these are pretty small, and we go on the basis of inspections of operation rather than complete reports, as we do in others.

MR. STEIN: Thank you.

Are there any other comments or questions?

MR. POSTON: To summarize, Perry, you would say that you would be in compliance with recommendations for municipal works and industrial works then by the end of 1968?

MR. MILLER: This is correct.

MR. POSTON: They would all be complete?

MR. MILLER: With the exception of nutrients and phosphates. As far as secondary treatment and chlorination of effluents, yes, and industrial wastes, yes.

MR. POOLE: I want to elaborate a little more.

We have just gone through our hearings in adopting the water quality standards, and in these hearings we have used these same timetables, but there is in our judgment a problem at Fort Wayne, which I think is legalized. The river is very small, in comparison with the whole sewage load, and we are saying that Fort Wayne will ultimately need tertiary treatment.

However, I think the treatment that is in effect at Fort Wayne will satisfy conditions at the State line, but it will not satisfy our new water quality criteria immediately below Fort Wayne.

MR. STEIN: Are there any other comments or questions?

MR. POSTON: I might ask Mr. Miller if he has any difficulties obtaining industrial waste information for open file?

MR. MILLER: No. I might say the only difficulty we really encountered was with Franke, and they lost their chemist and no longer had anyone to make the analyses for them. They are now in the process of contracting with an outside chemist to do this work for them, but we have had no difficulties.

MR. POSTON: Thank you.

MR. STEIN: Any further comments or questions?

(No response.)

MR. STEIN: If not, I think we have moved along rather well with this.

We will recess for an hour for lunch.

(Whereupon, at 12:10 p.m., a luncheon recess was taken.)

AFTERNOON SESSION

(1:10 p.m.)

MR. STEIN: May we reconvene?

We will call on the State of Michigan.

MR. OEMING: Mr. Chairman, Mr. Purdy has a statement to present on behalf of the State of Michigan. Mr. Purdy is the Chief Engineer.

STATEMENT OF RALPH PURDY, CHIEF ENGINEER,
MICHIGAN WATER RESOURCES COMMISSION,
LANSING, MICHIGAN

MR. PURDY: Chairman Stein, Conferees:

I am Ralph Purdy, Chief Engineer of the Michigan Water Resources Commission, and I have a written statement to present to you today on behalf of the Michigan Water Resources Commission.

At the reconvened conference in Cleveland, Ohio, in June 1966, the Michigan Water Resources Commission presented a report outlining the remedial action that had been instituted by the State of Michigan to abate pollution and to enhance and preserve the water quality in the Michigan waters of Lake Erie and its tributaries. This report pointed out how water quality goals had been established for the Detroit River and the Michigan waters of Lake Erie. It also described how industrial and municipal effluent restrictions were adopted by the Commission to meet the water quality goals and how formal stipulations setting forth time schedules for the construction of treatment facilities to meet these effluent restrictions were signed by 35 of the 36 industries and governmental entities involved. The summary of the third meeting of the conferees in the second session of this conference (June 22, 1966) states under Item (1) time schedules for remedial action, "The Michigan detailed remedial schedule (Appendix A) was reviewed and deemed to be satisfactory." This report then covers the compliance status of the previously accepted time schedules and certain other pertinent pollution control activities.

Scott Paper Company

It was previously reported to the conferees that the Michigan Water Resources Commission had not been able to reach an agreement with Scott Paper Company concerning improved waste treatment at its Detroit plant and that the Commission had taken the first step in enforcement proceedings to require pollution abatement. We are pleased to report that a stipulation was signed by the Scott Paper Company and the Commission on November 4, 1966, whereby the company agreed to restrict its waste discharges to the levels specified in the Notice of Determination and Hearing adopted by the Water Resources Commission. A copy of the Notice was contained in our report at the second session of this conference. The time schedule is as follows: (A copy of the signed Stipulation is included as Appendix A.)

This calls for:

Construction plans for solids reduction	May 1, 1967
Place solids reduction facilities in operation	May 1, 1968
Preliminary plans for BOD reduction	January 1, 1968
Construction plans for BOD reduction	January 1, 1969
Place BOD reduction facilities in operation	January 1, 1970

The signing of this Stipulation places all twenty-five industries and all eleven governmental entities along the Michigan shore of Detroit River-Lake Erie under a voluntary pollution abatement program with firm commitments as to effluent quality and time schedules for achieving that quality.

Industrial and Municipal Time Schedules

The time schedules previously reported are summarized in Appendix B and C. Twenty-three dates have fallen due in these schedules as of March 1967. Performance has been timely in each and every case.

Operating Reports

The Stipulations signed by the industries and governmental units previously mentioned contained the following clause:

> "Perform analyses to determine the content of the substances enumerated in paragraph 1 hereof to the extent necessary and sufficient to demonstrate compliance status, and file reports of said analyses with the Chief Engineer of the Commission at the end of each month, beginning January 31, 1967."

Standard report forms have been developed by the Commission and furnished to the various industries and governmental units. Reports are being received. A copy of the January 1967 report from the City of Detroit is included as Appendix D as an example of the type of data being received.

Water Quality Surveillance of the Michigan Waters of Lake Erie and its Tributaries

Michigan's water quality surveillance program of the Huron and Raisin Rivers was described to the conferees during the Cleveland conference in June 1966. In addition to these two monitoring programs that were started in 1963, the Commission has substantially expaned its surveillance of the Detroit River and Michigan waters of Lake Erie. This latter program is comprised of three major types of activities.

1. Sampling and testing of water samples of the Detroit River and Lake Erie at 65 locations along seven established river and lake ranges.
2. Sampling and testing of 75 municipal and industrial waste discharges along the Detroit, Rouge, Huron and Raisn Rivers.
3. Patrolling by boat and helicopter, during which the general condition of the river and waste discharges are observed.

Normally, one day a week is spent on each of the three types of activities. This schedule results in a sampling frequency of about once per month at each river observation point and waste discharge location. Where abnormal waste discharges are encountered, more frequent samples are taken and visits to the industry or governmental unit are made to secure improved operation of existing waste control facilities.

River range samples are normally tested for phenol, chlorides, sulfates, soluble phosphates, ammonia nitrogen, nitrate nitrogen, iron, cyanide, suspended solids, pH, dissolved oxygen and total coliform bacteria. Industrial and municipal waste discharges are sampled for the specific pollutional constituents peculiar to the individual waste. Each month about 700 individual analyses are performed by the Water Resources Commission on samples collected. All river range sample analyses data are forwarded to the International Joint Commission for its use.

River ranges that are being sampled under the Michigan Water Resources Commission surveillance program are DT 30.8 West, DT 30.7 East, DT 20.6, DT 14.6, DT 8.7, DT 3.9 and a range from the mouth of the Huron River to Detroit Light. There are another 19 stations in the Michigan waters of Lake Erie that are being sampled by the Federal Water Pollution Control Administration under a cooperative arrangement between Michigan and that agency.

An additional activity that has been instituted by the Commission is the night sampling dissolved oxygen profile determination. This has been established to get an idea of the oxygen consuming effect of storm water overflows from the various sources along the Detroit River. Minimum dissolved oxygen values have been observed near the mouth of the Detroit River about one to two days after heavy rains occur in the area. The Commission's program calls for sampling the entire length of the river after major storms that occur in late summer and early fall. The Federal Water Pollution Control Administration is also doing this type of night sampling, but only in an area at the mouth of the Detroit River. It is hoped that the data from these two programs will complement each other and that much will be learned of the effect of storm water overflows.

The 1966 water quality data for the Detroit River and Michigan waters of Lake Erie has been tabulated. Limited copies have been published and may be obtained from the Commission offices upon request.

APPENDIX A

STATE OF MICHIGAN

STIPULATION BETWEEN THE WATER RESOURCES COMMISSION

an agency of the State of Michigan
and
SCOTT PAPER COMPANY
a Pennsylvania Corporation

To restrict the content of industrial wastes
discharged to the waters of the State at
Detroit, Michigan

WHEREAS, the Water Resources Commission of the State of Michigan, hereinafter referred to as the Commission, is by law charged with the responsibility of protecting and conserving the water resources of the State of Michigan and the Great Lakes, which are or may be affected by waste disposal of municipalities, industries, public or private corporations, individuals, partnership associations, or any other entity; and

WHEREAS, the Commission is authorized by statute to control and prohibit the pollution of said waters and to bring any appropriate action deemed necessary to enforce any and all laws relating to the pollution of the waters of this state; and

WHEREAS, the Commission, meeting in the City of Detroit, Michigan on August 25, 1965 did adopt water quality goals to improve and protect the various water uses of the Rouge and Detroit Rivers and Michigan waters of Lake Erie; and

WHEREAS, the Commission, meeting in the City of East Lansing, Michigan, on January 6, 1966, did establish requirements and time schedules deemed necessary to be met by various industries and governmental units for abatement of their respective contributions to the pollution of the Rouge and Detroit Rivers, the Michigan waters of Lake Erie and its tributaries; and

WHEREAS, Scott Paper Company, a Pennsylvania Corporation, hereinafter referred to as the Company, discharges industrial wastes from its Detroit Plant at Detroit, Michigan into the Rouge River, said wastes containing suspended solids and oxygen consuming substances; and

WHEREAS, it is the opinion of the Commission that said substances in the wastes discharged by the Company are or may become injurious to the public health, safety or welfare; or are or may become injurious to domestic, commercial, industrial, agricultural, recreational, or other uses which are being made of such waters; or are or may become injurious to livestock, wild animals, birds, fish, aquatic life, or plants or the growth or propagation thereof be prevented or injuriously affected; or whereby the value of fish and game is or may be destroyed or impaired; and

WHEREAS, the Company, in consideration for the Commission's holding in abeyance the initiating of statutory procedures for pollution abatement as prescribed in Section 7, Act 245, Public Acts of 1929, as amended, desires to pursue a voluntary program to restrict and control the aforesaid substances contained in the wastes discharged or to be discharged from the Company's Detroit Plant into the waters of this state.

NOW THEREFORE IT IS HEREBY AGREED, between the respective parties hereto, that Scott Paper Company will:

1. Treat or control its industrial wastes to

the extent necessary that when discharged to the Rouge River they shall:

(a) not contain more than fifty (50) milligrams per liter of suspended solids in excess of that contained in the Company's water supply from the river.

(b) Not contain more than thirty one thousand (31,000) pounds per day of oxygen consuming substances, as measured by the five-day biochemical oxygen demand test, in excess of that contained in the Company's water supply from the river.

2. Provide facilities capable of producing the waste effluent quality specified in paragraph 1 hereof according to the following time schedule:

(a) Submit construction plans and specifications for facilities to attain the limitations on suspended solids to the Chief Engineer of the Commission and obtain his approval thereof by May 1, 1967.

(b) Complete construction of facilities to attain the limitations on suspended solids and place same in operation by May 1, 1968.

(c) Submit preliminary engineering study and basis of design for facilities to attain limitations on oxygen consuming substances by January 1, 1968.

(d) Submit construction plans and specifications for facilities to attain limitations on oxygen consuming substances to the Chief Engineer of the Commission and obtain his approval thereof by January 1, 1969.

(e) Complete construction of facilities to attain the limitations on oxygen consuming substances and place same in operation by January 1, 1970.

3. Perform analyses to determine the content of the substances enumerated in paragraph 1 hereof to the extent necessary and sufficient to demonstrate compliance status and file reports of said analyses with the Chief Engineer of the Commission at the end of each month, beginning January 31, 1967.

IT IS FURTHER AGREED between the parties hereto that, on or before January 1, 1967, the Company will certify to the Commission its decision on whether it will proceed independently or will contract with the City of Detroit for treatment utilizing facilities provided by the City, to comply with the restriction on oxygen consuming substances specified in paragraph 1(b) hereof. In the event the Company contracts with the City of Detroit, the waste loading allocated to the Company in said paragraph, less any amount contained in discharges made separately by the Company to the Detroit or Rouge rivers, will be added to the loading of oxygen consuming substances allocated to the City as set forth in paragraph 1(a) of the Stipulation between the Water Resources Commission and the City of Detroit, dated May 19, 1966, for control of the City's sewage and wastes; and the time schedule for development and construction of facilities to control oxygen consuming substances set forth in said Stipulation with the City of Detroit will be substituted for the requirements of paragraphs 2(c), 2(d) and 2(e) hereof.

IT IS FURTHER AGREED between the parties hereto that dilution of waste discharges with uncontaminated waters will not be utilized to attain the specified concentration restrictions enumerated in paragraph 1 hereof.

IT IS FURTHER AGREED between the parties hereto that in the event the Company fails to meet timely any of the provisions of this Agreement, the Company waives Notice of Determination and Hearing as provided by Section 7 of Act 245, Public Acts of 1929, as amended, and it is agreed that the Commission may, following Notice to the Company of its default of this Agreement, enter a Final Order of Determination incorporating the provisions of this agreement and requiring compliance with the uncompleted terms of this Agreement. PROVIDED FURTHER, however, that the Company may within ten (10) days after receipt of Notice of Default, petition the Commission for a hearing at which the Company will be given the opportunity to show cause why a Final Order of Determination should not be adopted by the Commission. Following said hearing the Commission may adopt a Final Order of Determination as aforesaid or may in its discretion grant a delay, extension, modification of or release from any or all provisions contained in this Stipulation.

SCOTT PAPER COMPANY,
a Pennsylvania Corporation

R. Purdy

By Robert I. Thierne
Vice President

WATER RESOURCES COMMISSION, of
the State of Michigan

By ____________________
Chairman

By Loring F. Oeming
Executive Secretary

Dated November 4, 1966

DETROIT RIVER-LAKE ERIE INDUSTRY STIPULATIONS
DATES FOR COMPLIANCE

Appendix B

Industry	Preliminary Eng. Study and Basis of Design	Approval of Construction Plans & Spec.	Complete Construction
Allied Chemical Corporation			
Semet-Solvay Division, Detroit		Apr. 1, 1966	Apr. 1, 1967
Solvay Process Division, Detroit		Nov. 1, 1966	Apr. 1, 1968
American Cement Corporation			
Peerless Division, Detroit		May 1, 1966	May 1, 1967
Consolidated Packaging Corporation			
North Side Plant, Monroe	Jan. 1, 1967	Jan. 1, 1968	Jan. 1, 1969
South Side Plant, Monroe	Jan. 1, 1967	Jan. 1, 1968	Jan. 1, 1969
Darling and Company, Melvindale		Nov. 1, 1966	Nov. 1, 1967
E. I. duPont de Nemours & Co., Inc.			
Ind. & Biochem. Div., Ecorse		Apr. 1, 1966	Apr. 1, 1967
Firestone Tire & Rubber Co., Firestone Steel Products Div., Riverview		Nov. 1, 1966	Nov. 1, 1967
Ford Motor Co.			
Monroe Plant		Dec. 1, 1966	+24 months
Rouge Plant, Dearborn			
Other than iron and susp. solids		Oct. 1, 1966	+17 months
Iron		Mar. 1, 1967	+24 months
Suspended solids		Mar. 1, 1967	+27 months
Great Lakes Steel Corporation			
80" Hot Strip Mill, Ecorse		Nov. 1, 1966	Apr. 1, 1968
Steel Rolling Mill, Ecorse - Other than acid & iron		Nov. 1, 1966	Apr. 1, 1968
Steel Rolling Mill, Ecorse - Acid and iron	April 1, 1967	Dec. 1, 1967	Apr. 1, 1969
Blast Furnace, River Rouge		Nov. 1, 1966	Apr. 1, 1968
McLouth Steel Corporation, Trenton		Nov. 1, 1966	Apr. 1, 1968
Mobil Oil Company, Trenton		Nov. 1, 1966	Nov. 1, 1967
Monsanto Company			
Trenton Plant	Nov. 1, 1967	Aug. 1, 1968	Start const. Nov. 1, 1968 In operation Nov. 1, 1969
Trenton Resins Plant	Nov. 1, 1966	Apr. 1, 1967	Apr. 1, 1968
Pennsalt Chemicals Corporation			
East Plant, Wyandotte		Nov. 1, 1966	Apr. 1, 1968
West Plant, Riverview		Nov. 1, 1966	Apr. 1, 1968

Industry	Preliminary Eng. Study and Basis of Design	Approval of Construction Plans & Spec.	Complete Construction
Revere Copper & Brass, Inc., Detroit		Nov. 1, 1966	Nov. 1, 1967
Scott Paper Company, Detroit			
(for BOD)	Jan. 1, 1968	Jan. 1, 1969	Jan. 1, 1970
(for Solids)		May 1, 1967	May 1, 1968
Time Container Corporation, Monroe Monroe Paper Products Division	Jan. 1, 1967	Jan. 1, 1968	Jan. 1, 1969
Union Bag-Camp Corporation, Monroe	Jan. 1, 1967	Jan. 1, 1968	Jan. 1, 1969
Wyandotte Chemicals Corporation			
North Works, Wyandotte		Nov. 1, 1966	Apr. 1, 1968
South Works, Wyandotte		Nov. 1, 1966	Apr. 1, 1968

DETROIT RIVER-LAKE ERIE GOVERNMENTAL UNIT STIPULATIONS
DATES FOR COMPLIANCE

Unit	Preliminary Eng. Study and Basis of Design	Approval of Construction Plans & Spec.	Complete Construction
Townships			
Berlin Townshib	May 1, 1967	May 1, 1968	May 1, 1969
Frenchtown Township	May 1, 1967	May 1, 1968	May 1, 1969
Grosse Ile Township	Apr. 1, 1967	Nov. 1, 1968	Nov. 1, 1970
Monroe Township	May 1, 1967	May 1, 1968	May 1, 1969
County			
Wayne County	Apr. 1, 1967	Nov. 1, 1968	Nov. 1, 1970
Cities and Villages			
City of Detroit	Apr. 1, 1967	Nov. 1, 1968	Nov. 1, 1970
Village of Estral Beach	May 1, 1967	May 1, 1968	May 1, 1969
City of Luna Pier	May 1, 1967	May 1, 1968	May 1, 1969
City of Monroe	May 1, 1967	May 1, 1968	May 1, 1969
City of Riverview	Apr. 1, 1967	Nov. 1, 1968	Nov. 1, 1970
City of Trenton	Apr. 1, 1968	Nov. 1, 1969	Nov. 1, 1970

OPERATION REPORT OF WASTE TREATMENT PLANT FOR

WPC -

Detroit, Michigan

MONTH January 19 67

DATE	WASTE				5 DAY B.O.D.					SUSPENDED SOLIDS					CHLORINE RESIDUAL			PLANT EFF	CHLORIDES		IRON		PHENOL	
	Temp.	Flow	pH		INFLUENT		EFFLUENT		REM.	INFLUENT		EFFLUENT		REM	mg/l			TOTAL COLI.			Fe			
	°F	MGD	H	L	mg/l	lbs	mg/l	lbs	%	mg/l	lbs	mg/l	lbs	%	High	Low	D Avg.	per 100 ml	mg/l	lbs	mg/l	lbs	mg/l	lbs
1					76	352	60	278	21.1	129	574	62	287	50.0				3600					0.022	380
2					179	797	69	307	61.5	220	980	80	356	63.6				21000					0.154	686
3					116	598	69	356	40.6	178	917	97	500	45.5				4300					0.098	505
4					218	1131	---	---	----	302	1566	---	----	----				9300					-----	---
5					318	1649	97	503	69.5	225	1167	102	529	54.7				43000					0.110	571
6					145	733	99	500	31.8	206	1041	114	576	44.7				23000					0.122	617
7					98	920	82	770	16.3	351	3296	200	1878	43.0				2400					0.036	338
8					173	1011	82	479	52.6	485	2835	187	1093	61.5				2400					0.066	386
9					188	1047	109	607	42.0	261	1454	136	758	47.9				910					0.088	490
10					180	979	85	462	52.8	259	1408	117	636	54.8				43000					0.080	435
11					128	676	85	449	33.6	237	1251	68	359	71.3				9300					0.134	707
12					248	1320	99	527	60.1	298	1586	118	628	60.4				4300					0.055	293
13					201	1217	155	939	22.9	316	1913	166	1005	47.5				4300					0.055	333
14					145	793	81	443	44.1	232	1269	130	711	44.0				3600					0.040	219
15					148	620	79	331	46.6	174	729	90	377	48.3				23000					0.045	188
16					177	885	109	545	38.4	268	1340	114	570	57.5				9300					0.090	450
17					136	699	95	488	30.2	210	1079	105	539	50.0				2300					0.140	719
18					126	619	78	383	38.1	152	746	74	363	51.3				2300					0.090	442
19					200	982	154	756	23.0	208	1021	100	491	51.9				2300					0.134	658
20					187	938	74	371	60.4	218	1094	129	622	43.1				360					0.178	893
21					168	837	106	536	36.9	240	1213	117	591	51.3				23000					0.045	480
22					124	600	84	406	32.3	164	793	82	397	50.0				23000					0.065	314
23					142	867	108	660	24.0	420	2563	154	940	63.3				23000					0.095	580
24					144	764	112	595	22.2	202	1179	94	499	53.5				9300					0.084	446
25					160	1069	111	741	30.6	431	2879	202	1349	53.1				3600					0.070	468
26					140	818	92	538	34.3	300	1754	164	954	[illegible].3				2300					0.095	555
27					93	719	64	495	31.2	190	1469	98	758	48.4				4600					0.078	603
28					120	829	87	601	27.5	252	1741	125	864	50.4				2300					0.066	456
29					170	890	84	440	50.6	174	911	90	471	48.3				2300					0.070	367
30					100	552	---	---	----	156	861	80	441	48.7				4300					0.065	359
31					197	1120	136	774	31.0	203	1154	97	552	52.2				360					0.156	887
Arith. Mean					160	853	45	527	38.1	247	1412	116	670	51.9				----					91	494
Stat Mean					158	877	90	500	43.0	240	1332	114	633	52.5				5400					87	483

OPERATION REPORT OF WASTE TREATMENT PLANT FOR

WRC--

Detroit, Michigan

MONTH January 1967

DATE	CHLOROFORM SOLUBLE MATERIALS			SOLUBLE ORTHOPHOSPHATE (PO4)					AMMONIA		NITRATES		CYANIDE Cn mg/l		TOTAL CHROMIUM Cr mg/l		NICKEL Ni mg/l		CADMIUM Cd mg/l		ZINC Zn mg/l		COPPER Cu mg/l		HYDROGEN SULFIDE H_2S
				INFLUENT		EFFLUENT		REM.	NH_3-N		NO_3-N														
	mg/l	1000 lbs	Visual Film	mg/l	1000 lbs	mg/l	1000 lbs	%	mg/l	lbs	mg/l	lbs	High	Avg.	High	Avg.	High	Avg.	High	Avg.	High	Avg.	High	Avg.	mg/l
1	76.0	352		2.1	9.7	5.1	23.6																		
2	22.0	98		13.5	60.1	10.9	48.5	19.3																	
3	52.7	272		11.8	60.8	11.5	59.3	2.6																	
4	----	---		17.3	89.7	----	----	----																	
5	49.8	258		8.8	45.6	6.0	31.1	31.8																	
6	22.7	115		1.5	7.6	0.6	3.0	60.0																	
7	----	---		2.4	22.5	0.9	8.5	62.5																	
8	42.7	250		3.9	22.8	3.0	17.5	23.1																	
9	36.4	203		9.9	55.2	3.3	18.4	66.7																	
10	48.3	263		1.2	6.5	2.4	13.0	----																	
11	65.0	343		8.5	44.9	7.5	39.6	11.8																	
12	55.4	295		4.8	25.5	2.7	14.4	43.8																	
13	68.7	416		9.0	54.5	6.0	36.3	33.3																	
14	49.8	272		6.6	36.1	4.5	24.6	31.8																	
15	29.2	122		4.5	18.8	4.5	18.8	----																	
16	85.5	428		10.5	52.5	5.7	28.5	45.7																	
17	48.1	247		7.8	40.1	8.1	41.6	----																	
18	67.2	330		5.7	28.0	7.2	35.3	----																	
19	21.6	106		5.4	26.5	7.5	36.8	----																	
20	30.6	154		4.5	22.6	2.7	13.5	40.0																	
21	86.2	435		6.3	31.8	7.5	37.9	----																	
22	25.2	122		10.8	52.2	10.8	52.2	----																	
23	45.1	275		----	----	----	----	----																	
24	58.7	312		7.2	38.2	7.8	41.4	----																	
25	44.1	295		7.5	50.1	6.0	40.1	20.0																	
26	64.6	378		4.5	26.3	3.9	22.8	13.3																	
27	149.6	1157		6.6	51.0	5.7	44.1	13.6																	
28	----	---		4.2	29.0	4.2	29.0	----																	
29	----	---		8.1	42.4	6.9	36.1	14.8																	
30	22.4	124		6.6	36.4	9.3	51.3	----																	
31	40.8	232		9.0	51.2	6.0	34.1	33.3																	
Arith. Mean	52.2	291		7.0	38.0	5.8	31.1	17.1																	
Stat Mean	51	283		6.8	37.8	5.8	32.2	14.7																	

That completes my formal statement.

MR. STEIN: Thank you, Mr. Purdy.

Are there any comments or questions?

Mr. Oeming?

MR. OEMING: Apropos, Mr. Chairman, of the question you raised earlier about specific limitations on phosphates, I would like to have Mr. Purdy clarify his statement along this line.

My question would be: Do the schedules and the timetable requirements that have been set up include specific requirements for phosphate removal?

MR. PURDY: Where phosphate is a major constituent of the discharge, a requirement has been set up for the reduction of phosphates, and it includes a timetable for the phosphate reduction to be accomplished.

The preliminary report for Detroit due April 1st of 1967 has been received, and the preliminary design basis includes the information that the people in Detroit have received from the Ada Oklahoma Laboratory report on the removal of phosphates by activated sludge. Their preliminary design basis has incorporated this information into it.

MR. STEIN: Any further comments or questions?

MR. POSTON: I would like to comment and to ask Mr. Purdy a question.

I note that in the Indiana report, they were very specific in going into each of the industries and municipalities in the total Maumee Basin, which is a tributary area in Indiana, tributary to Lake Erie. They indicated they would have a schedule of 1968 for abatement of pollution from both the industries and municipalities. I see that the State of Michigan has a schedule for an area where they have made stipulations in 25 industries and 11 governmental entities along the Michigan shore of the Detroit River-Lake Erie. My question is to Mr. Purdy: Does this schedule apply to all of the municipalities and industries which are within the Lake Erie Basin and tributary thereto?

MR. PURDY: Mr. Poston, you, of course, remember the time schedule that was presented at the June 1966 conference with respect to these specific industries and municipalities along the Detroit River. You are not asking about that?

MR. POSTON: No. I am wondering whether this total tributary area in Michigan is under this schedule.

MR. STEIN: Do you have any other specific areas in mind, Mr. Poston?

MR. POSTON: Yes, sir.

MR. STEIN: What?

MR. POSTON: Well, I am interested in the Raisin

River Basin, in this area, and the municipalities and industries. I think your Detroit conference pertained to areas along --

MR. STEIN: How about the Huron River? Are you interested in that too?

MR. POSTON: Well, I am interested in knowing whether or not all of the municipalities and industries are in this schedule that are tributary to Lake Erie.

MR. PURDY: The schedules that have been presented to you deal specifically with those that are named.

Now, if we are speaking about the Raisin River, there are a couple of small communities on the Raisin River that have raw sewage of human origin discharging to the river. These communities were called before our Commission, along with some 150 other communities in the State of Michigan last year, and asked to develop a voluntary program to correct this problem.

The Commission indicated to them that if such a program was not forthcoming, that they would take whatever action might be necessary to develop a formal program that would meet with their time schedule.

On the Huron River, the only facilities that I can think of that do not have secondary treatment are the Flat Rock and Rockwood Plants of the Wayne County System.

A notice of determination and hearing has been authorized by the Commission with respect to those two plants, and the Commission will consider the adoption of that at its meeting later on this month.

Time schedules have not been firmly established. However, I might point out that in the summary of a program to control and abate pollution, that the Commission is considering as a part of this water quality standards hearing, that it include the following: With respect to those that have discharge of raw sewage of human origin, the conferences have been to form background information for subsequent decision by the Commission as to what action might be necessary if abatement of the problem is not forthcoming within a reasonable period of time on a voluntary basis.

In those instances where a voluntary program has not been proposed, or where, in the opinion of the Commission, it appears that a proposed voluntary program will not be successful or may not be accomplished within a reasonable period of time, statutory procedures are being initiated.

Final orders adopted by the Commission contain specific dates for approval of completed construction plans and specifications, awarding of construction contracts, and commencing of construction. For the completion of construction and attainment of abatement, a typical time schedule requires the completion of construction plans within twelve months from the date of the adoption of the order, contract awards and construction start within twenty-four months, and construction completion and abatement within thirty-six to forty-two months.

The Commission is pursuing a program to secure abatement of presently identified discharges of raw sewage of human origin to public waters of the State no later than June 1st of 1972, subject to conditions which are not within the control of the Commission. We have in mind there those instances where we may have to go into court enforcement of the Commission order.

Now, with respect to the phosphate problem it is the Commission's intent to require that nutrients in public waters particularly with respect to phosphates traceable to industrial or municipal waste sources be controlled to the extent necessary to meet the water quality objectives for the receiving waters.

Persons proposing to make new or increased use of waters of the State for waste disposal purposes will be required to utilize such technology and processes which are known.

The long-term objective is to require that phosphates traceable to all industrial or municipal waste sources be controlled no later than June 1, 1977, to the extent necessary to provide for water quality enhancement of the public water uses, commensurate and consistent with present and proposed future water uses and consistent with the requirements of the Water Resources Commission statute.

With respect to the Commission's program, it embarked first on those which it felt were of the largest magnitude and had a direct bearing on the water quality of the Detroit River and Michigan waters of Lake Erie. The other problems that we are discussing, I believe, in your question are those that have been looked at as a second step in this entire matter.

MR. POSTON: Well, I think what I was concerned with is whether or not, when we develop time schedules, as I assume we will at this meeting, that this time schedule applied to all of the tributary area within or the area tributary to Lake Erie, such as Ann Arbor, Ypsilati and these areas. This was the purpose of my question, to see whether these would be also --

MR. PURDY: Ann Arbor has secondary treatment at the present time.

MR. POSTON: How about the chlorination of the effluent?

MR. PURDY: The Michigan Department of Public Health has sent out a notice to all Michigan municipalities that they are expected to chlorinate their sewage treatment plant effluents on a year-'round basis as of now.

MR. POSTON: The other reason that I brought this up was the fact that it had been necessary for us in our grants program to question and turn down a grant for a particular treatment plant that required less than secondary treatment, those that had proposed less than secondary treatment.

MR. PURDY: Those are included in the ones that the Commission has authorized a notice of determination and hearing on.

MR. EAGLE: Mr. Chairman?

MR. STEIN: Yes.

MR. EAGLE: I think Mr. Poston is out of order. I don't think that this was the subject of this conference, the intrastate waters of Michigan. Intrastate waters of Ohi will be included in the conference, but not the intrastate waters of Michigan, so I think we are off the subject.

MR. STEIN: Anything that affects Lake Erie. I think what we have done here is to try not to make hard and fast rules on order. We leave it to the conferees to decide what is relevant and what is not, and I think we all know we are dealing with the situation in Lake Erie in large part.

Are there any further comments or questions?

(No response.)

MR. STEIN: If not, thank you, Mr. Purdy, for your statement.

Again, I take it here that you expect to have all the sources of Michigan under control within the dates you have set for the Detroit River? They will not be lagging behind that?

MR. OEMING: We have no reason to expect that.

MR. STEIN: All right.

Mr. Eagle, would you make the presentation for Ohio, please?

STATEMENT OF GEORGE H. EAGLE, CONFEREE AND CHIEF ENGINEER, OHIO DEPARTMENT OF HEALTH, COLUMBUS, OHIO

MR. EAGLE: Mr. Chairman, Conferees and Ladies and Gentlemen:

My name is George H. Eagle. I am the Chief Engineer of the Ohio Department of Health. The division of engineering which I head serves as the technical unit for the Ohio Water Pollution Control Board. I submit this report on behalf of the Ohio conferees and the Board. I wish to submit this entire report for the record.

MR. STEIN: Without objection, it will be entered in the record as if read.

MR. EAGLE: Since the third meeting of the conferees on pollution of Lake Erie and its tributaries, held in Cleveland on June 22, 1966, the Ohio Water Pollution Control Board has held two hearings in the Lake Erie Basin as required by Section 10(e) of the Federal Water Quality Act of 1965, one at Toledo, Ohio, on September 22, 1966, on the Maumee River and its tributaries and one in Celveland on November 30, 1966, on the Ohio portion of Lake Erie. A third hearing on the interstate waters in this basin is planned for late May this year. This hearing will include Ashtabula, Conneaut and Turkey Creeks, which originate in Pennsylvania and flow through Ohio to Lake Erie. Hearing will be held on the remaining intrastate tributaries of Lake Erie later this year.

The water quality criteria and standards that I recommended to the Board at the hearings conform in all respects to the August 1965 Recommendations and Conclusions of the conferees, and in some respects exceed them. An example of my recommendations is given in Appendix II of this report. You will note that all permittees must make studies of their combined sewer problems and make improvements where feasible, must provide treatment supplementary to secondary treatment where necessary and practicable, and that the Northwest Ohio Water Plan being developed by the Ohio Water Commission is made a part of the Board's plan. These criteria and standards as well as those for Lake Erie and the three small interstate tributary streams in eastern Ohio will be forwarded to the Secretary of the Interior for his concurrence before June 30, 1967.

Following is Ohio's status report on the applicable items in the Recommendations and Conclusions of August 1965.

WASTE TREATMENT

Secondary Treatment (Items 7 and 22)

As reported at the third meeting of the Lake Erie conferees on June 22, 1966, the Ohio Water Pollution Control Board has required that all sewage discharged to Lake Erie and its tributaries be given not less than secondary treatment (biochemical oxidation); in a number of instances additional or supplementary treatment is being required to meet local stream-water quality criteria and uses. Following is a summary of the schedules placed in effect by the Board (see Appendix I for detailed listings):

MR. STEIN: Mr. Eagle, just for clarification, what do you mean by secondary treatment and biochemical oxidation, for example, in reduction of BOD?

MR. EAGLE: I am talking about 90 percent.

MR. STEIN: Thank you.

MR. EAGLE: Eighty-five to 90 percent. I think we kid ourselves sometimes with this 90 percent.

MR. STEIN: That is right. The difficulty is if we talk about 90 percent and we go around to check, we find we are doing 85 to 95. The trouble is that we talk about 85, and we find ourselves doing between 60 and 75.

So I always like that 90 percent. At least we are in the high 80's.

(Laughter.)

MR. EAGLE: Thank you.

MR. METZLER: May I ask a question?

MR. EAGLE: Yes, sir.

MR. METZLER: I have great admiration for the Chairman's legal abilities and ability to preside, and his engineering abilities here, but please don't say that some of these plants designed for 85 percent just actually turn out only 60 or 75 percent. We think we know more about engineering in our New York plants. I think in New York if we design them for 85, we are going to get 85.

MR. STEIN: I hope you will. I don't say I know anything about engineering.

The only thing is, I have read the dismal litany of the engineering records and when I see a plant designed at 85 percent come in by your certification with 60, 66, 70 and 72, I begin to get discouraged.

MR. METZLER: We are going to improve on that.

MR. STEIN: All right, Mr. Eagle.

MR. EAGLE: (1) Number of adequate municipal and county secondary treatment facilities completed and placed in operation since August 1965 8

(2) Number of municipalities, counties and other entities not having adequate -- I stress this word "adequate" -- secondary treatment facilities (several smaller installations added to August 1965 and June 1966 lists) 88

(a) Under construction - completion in 1967 or early 1968 25

(b) Construction to be completed not later than end of 1969 44

(c) Construction to be completed not later than end of 1970 16

(d) Construction to be completed -- and here I would like to interject into the record, secondary treatment, 1970 and entire plant in 1971 (Westerly-Cleveland) 1

Note: The itemized figures (a, b, c, and d) do not include the existing secondary works at Cleveland Easterly, Cleveland Southerly, Akron and Toledo, where improvements and enlargements will be made over the next several years.

I would like to explain, and I think you all understand, that these major municipal plants, so far as being adequate is concerned, are actually never quite adequate in all respects. Improvements and enlargements are constantly under way.

MR. STEIN: Mr. Eagle, let me ask one more question for clarification:

What is going to be done with the sludge particularly from the Cleveland plants, Easterly and Westerly? Is it going to be kept out of the lake and pumped to another plant?

MR. EAGLE: Well, as you know, all of the sludge from the Easterly plant presently goes to the Southerly plant. What the plans are going to be for the Westerly plant, I am not sure. They haven't been developed, as far as

I know.

MR. STEIN: I am not talking about the details of the plans, but is the sludge going to be kept out of the lake?

MR. EAGLE: You mean, so far as nutrients are concerned?

MR. STEIN: No, completely; or are you going to put the sludge in? Are you going to use the lake as a disposal basin for the sludge?

MR. EAGLE: Well, are we doing this at present?

MR. STEIN: That is what I would like to ask.

MR. EAGLE: No, no. We are not discharging the sludge to the lake, that I know of. In a sewage treatment plant, sludge to the lake?

MR. STEIN: Yes.

MR. EAGLE: Not to my knowledge.

MR. STEIN: All right. Thank you.

MR. EAGLE: These lists have been considerably refined over those submitted last June at Cleveland. Detailed schedules have been worked out with the officials and consulting engineers. A few entities included on the June 1966 lists have been dropped, others found to be not fully meeting the conference conclusions and recommendations have been added. All schedules have been accepted by the Ohio Water

Pollution Control Board and have been and will be included in the individual permit conditions and orders.

Disinfection (Item 9)

All municipalities, counties and other entities discharging sewage directly, or nearly directly to Lake Erie which have chlorinating facilities have been ordered to operate such facilities continuously. Those not having the necessary facilities have been ordered to provide them before the next bathing season or incorporate them in their secondary treatment plans.

Removal of Phosphates (Items 7 and 8)

As previously reported, studies are being made on maximizing phosphate removals at all of the major secondary sewage treatment plants in the Lake Erie basin. Regular analysis are being made of influent and effluent samples, adjustments are being made to improve removals and in some instances pilot and/or experimental studies are being carried out. At Cleveland Easterly plant a full scale plant study is proposed.

In addition, the Division of Engineering of the Ohio Department of Health has advised consulting engineers that every consideration, such as high suspended solids in aeration tanks, more air capacity than heretofore required, and handling of waste activated sludge in separate digestion facilities, must be given in the design of improvements to existing and to new secondary treatment facilities.

Bypassing Untreated Sewage (Item 10)

In addition to the plans review requirements reported last June, several municipalities and counties have been ordered by the Water Pollution Control Board to make studies and develop programs for reduction of excessive storm water and infiltration from their sewerage systems. Also sewage treatment plant enlargements have been ordered in a number of instances to reduce the necessity of bypassing.

Combined Sewers (Item 11)

A full report was given on this item last June. The program as outlined at that time is being pursued and extended to all municipalities having combined sewers. Many are having studies made of this problem. For example, the cities of Port Clinton and Berea have developed specific plans for complete separation of their combined sewers.

Treatment Schedules - Industrial Wastes (Items 16 and 22)

The Ohio Water Pollution Control Board is requiring that all industrial wastes be segregated and treated as specified in Item 16 of the Conference Recommendations and Conclusions and they have so stipulated in the permit conditions issued to each industry listed in Appendix I. Following is a summary of those listings.

(1)	Number of facilities completed and placed in operation since August, 1965 - adequate facilities	13
(2)	Number of industries not having adequate treatment of reduction facilities	82
(a)	Under or near under construction - completion in 1967	26
(b)	Construction to be completed not later than end of 1968	28
(c)	Construction to be completed not later than end of 1969	28

You will note that a number of industries have been added since the June, 1966 report. A number of small industries not previously included, changes in operations, and new industries are the principal reasons for this increase.

All schedules listed in Appendix I have been accepted by the Ohio Water Pollution Control Board and have been or will be included in the individual permit conditions and orders.

Sampling and Reporting of Industrial Waste Discharges (Items 13, 17 and 18)

As reported last June, the Ohio Department of Health has required for the past several years that industries as well as municipalities and others responsible immediately report spills that may seriously impair stream quality, and further, that immediate steps be taken to eliminate spills in the streams.

This program is constantly stressed not only by the Ohio Department of Health and the Water Pollution Control Board but also by the Ohio Division of Wildlife. Ohio law requires polluters to pay for aquatic life damages. This program is very effective. Very good cooperation is received.

Ohio has required a regular sampling and analysis of major industrial discharges since the adoption of the Water Pollution Control Law in 1951. Presently industries are required by Water Pollution Control Board permit condition to report monthly on the volume and critical characteristics of the wastes as discharged. Our staff personnel are working with industry representatives with respect to type and frequency of samples and analytical procedures.

The program for placing all wastewater and stream monitoring information on data processing is well under way. Stream data is presently being so handled and data with respect to municipal and industrial waste treatment facilities is being codified. Municipalities and industries will be required to submit data in the proper form to be so handled. Data will be published at least at yearly intervals.

Pollution Surveillance of Lake Erie and its Tributaries (Item 19)

The State of Ohio by contract with the Water Quality Branch of the Geological Survey of the U. S. Department of the Interior, has established the following automatic monitoring stations:

Maumee River near Defiance - DO, Conductivity, Temperature

Auglaize River near Defiance - DO, Conductivity, Temperature

Maumee River at Waterville - DO, Conductivity, Temperature, pH

Black River at Elyria - DO, Conductivity, Temperature

Cuyahoga River at Independence - DO, Conductivity, Temperature

Cuyahoga River at DuPont at Cleveland - Conductivity

Cuyahoga River at West Third Street, Cleveland - DO, Conductivity, Temperature, pH

Grand River at Painesville

Sandusky River below Fremont

Maumee River at the mouth

Auglaize River below the Ottawa River at Cascade Park

During fiscal year 1968, four-parameter monitors (DO, Conductivity, Temperature, and pH) will be installed in the Ashtabula River at Ashtabula.

The cooperative program between Ohio and the U. S. Geological Survey includes, in addition to the monitoring stations, a complete chemical analysis for the days of maximum and minimum conductance each month and analyses for dissolved oxygen, detergents, total phosphates, iron, and manganese are made monthly. A thermograph record is obtained for the Huron River at Milan.

In addition to the above, complete chemical analyses are obtained annually during low stream flow for about thirty (30) gaging stations on streams tributary to Lake Erie.

Also, in addition, it is planned to collect samples of selected Lake Erie water intakes for complete chemical analyses including nutrients at monthly intervals.

DISPOSAL OF REFUSE (Item 14)

Inspections and Actions

You will note in Appendix III that (8) eight dumps along streams in the Lake Erie basin have been investigated by Ohio Department of Health personnel since the June conference last year. Definite actions have been taken for elimination or correction of all of these pollution problems.

I don't mean to say that we only investigated eight, but definite actions were taken on eight.

Proposed Legislation

Legislation has been authored by the Division of

Engineering and presented to the Administration for introduction into the Ohio General Assembly, now in session.

This legislation would place the responsibility for the control of solid wastes disposal in the Division of Engineering of the Ohio Department of Health.

The salient features of the bill are:

(1) Grant the Public Health Council (State Board of Health) authority to adopt regulations having uniform application throughout the state. These regulations would establish minimum standards for the location and operation of all solid waste disposal sites and facilities, including those installed to dispose of wastes from domestic, commercial, agricultural and industrial establishments;

(2) Provide for approval by the Department of Health of plans, facilities, equipment and supplies for all solid waste disposal sites and facilities;

(3) Require annual licensing of all disposal sites and facilities;

(4) For all intents and practical purposes, prohibit open dumping and open burning.

(5) Provide for inspection and policing of all solid waste disposal sites and facilities by the local and state health departments.

(6) Provide for penalties or injunctive action against any person, firm, or corporation, whether public or private, for failing to comply with the provisions of the law or the regulations adopted pursuant thereto.

In addition to these proposed new laws we are recommending an amendment to an existing law (Sec. 3767.16) which would prohibit the placing of any putrescible or hazardous substance or any solid waste upon or into any "waters of the state" or into any place from which it may run or wash therein and further to prohibit placing such wastes on or along any roadway, public park or publicly owned land.

It is further proposed that a new section of law be enacted which would enable any police officer, game protector, park superintendent, or authorized employee of the state health department or local health department, to arrest on sight, and without a warrant, any person observed violating this law.

We in Ohio fully intend to do our utmost to assure that all solid wastes are disposed of properly and more pointedly, to make certain they do not pollute our waters.

We are willing and ready to tackle this tremendous job and we hope to convince our legislators and the people of the need.

That is my report. Thank you.

APPENDIX I

1. Municipal and County Waste Treatment Facilities (Exhibits A-D, inclusive - Schedule of City of Cleveland, Ohio)

2. Industrial Waste Treatment Facilities

KEY TO ABBREVIATIONS

Treatment Facilities - Pr. = Primary

Int. = Intermediate

Sec. = Secondary

D = Disinfection by chlorination

S.D. = Sewer District of County

Type Sewer System

S = Separate

C = Combined

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
BLACK RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Avon	7,651	French Crk	S - Sec. 800 PE (Part of City)	1955	New treat. facils (secondary) for entire city.	Detail Plans 6-15-68 Construction 12-15-69
Lorain	76,910	Black R.	S - Pr+D 100,000 PE	1956	Improvements - secondary treat.	Rep.& G.Plan 3-15-67 Detail Plans 6-20-68 Construction 12-15-70

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CHAGRIN RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Villages						
Aurora	4,725	Chagrin R.	S - Sec. 2,500 PE	1928	Improvements -	Rep.& G.Plan - Approved Detail Plans 4-15-67 Construction 10-15-69
Sewer Districts						
Geauga County						
Bainbridge Twp. S.D.#2 Ravenwood Subdiv.		McFarland Creek, Chagrin R.	S - Sec. 100 PE	1966	None	In oper. 1966
Bainbridge Twp. S.D.#3		Chagrin R.	No public sewers.	-	Sewers & connection to Chagrin Falls sewer system.	Negotiations underway.

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Akron	298,052	Cuyahoga R.	S-Sec.+Prechl. 330,000 PE	'29,'57	Addtnl treat.facils (Phase I - addtnl second.treat.) (Phase II - addtnl primary treat.)	Phase I - Under construct Phase II--Det.Pl.9-15-67 Construction early 1970
Cleveland	858,823 + 484,423 21 Trib.Munic's	Cuyahoga R.	S & C Southerly Sec. 680,000 PE	'27,'38,'56	Addtnl treat.facils	See attached schedule - City of Cleveland
Independence	7,769	Cuyahoga R.	No public sewers.	-	New treat. facils - secondary.	Rep.&G.Plan 6-15-67 Detail Plans 6-15-68 Construction 12-15-69
Kent	23,286	Cuyahoga R.	S - Sec.+D 53,000 PE	'54,'66	Complete construct. second.treat.facils.	6/67
Maple Heights	34,612	Swan Crk	S - Sec.+D 10,000 PE	1955	Complete construct. new facils - second.	4/67
Solon	8,032	Trib.of Cuyahoga R.	S - Sec.+D 7,000 PE 7,800 PE-New	1962	Complete construct. new N.E. facils.	9/67

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Villages						
Mantua	1,239	Cuyahoga R.	S - Sec. 1,000 PE	1915	New Treat. facils - secondary.	Under construct. 4/67
Middlefield	1,566	Trib.of Cuyahoga R.	C - Pr. 1,800 PE	'54,'57	Improvements - secondary treat.	Detail Plans 6-15-67 Construction 8-15-68
Munroe Fall	2,849	Cuyahoga R.	- 2,849 PE	-	Sewers and connection.	Part of Summit County Mud Brook Project.
Northfield	3,156	Trib's of Cuyahoga R.	S - Sec.+D 5,965 PE	'59, '65	None	Improvements completed 1965.
Oakwood (Cuyahoga Co.)	3,283	Trib.to Tinkers Crk	S - Prim. 200 PE	1940	New treat. facils - secondary.	Rep.& G.Plan 3-15-67 Detail Plans 7-15-67 Construction 9-15-68
Sewer Districts						
Cuyahoga County						
Brecksville S.D.#13 (Brecksville)		Cuyahoga R.	S - Sec.+D 10,000 PE	1962	Improvements - addtnl treat.facils.	Rep.& G.Plan 12-15-67
Brecksville S.D.#13 Southern Estates		Cuyahoga R.	S - Sec.+D 300 PE	1966	None	Completed in 1966.
Portage County						
Aurora Acres S.D.		Trib.of Tinkers Crk	S - Sec.+D 400 PE	1958	None	
Ravenna S.D.#1 Lakeview Gardens Allot		Breakneck Creek	S - Sec.+D 200 PE	1963	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Portage County - contd.						
Shalersville S.D.#2 Bolingbrook Allot		Cuyahoga R.	S - Sec.+D 128 PE	1960	None	
Streetsboro S.D.#2 Rolling Hills Acres		Trib.of Tinkers Crk	S - Sec.+D 400 PE	1961	None	
Summit County						
Munroe Falls S.D. Plant #11		Trib.of Cuyahoga R.	S - Sec.+D 150 PE	1961	None	
Northampton SD-Plant #2 - Hidden Valley Subdiv.		Trib.of Mud Brook	S - Sec.+D 400 PE	1958	None	
Northampton SD-Plant #3 Bellridge Subdiv.		Trib.of Mud Brook	S - Sec.+D 200 PE	1959	None	
Northeast SD-Plant #9 Macedonia Estates		Brandywine Creek	S - Sec.+D 300 PE	1961	None	
Stow Twp. SD-Plant #4		Cuyahoga R.	S - Prim. 2,000 PE	1924	Construction of Interc.Project*	Bids taken 5-1-67

* - Summit Co.-Mud Brook Interc.Proj.-Det.Plans apprvd & Fed.Grant Offer made.

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
GRAND RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
City						
Painesville	17,689	Grand R.	S - Int.+D 24,326 PE	1958	Improvements - secondary treat.	Rep.& G.Plan 12-31-67 Detail Plans 9-30-68 Construction 12-31-70
Villages						
Fairport Harbor	4,260	Grand R.	S - Int.+D 6,000 PE	1958	Improvements - secondary treat.	Rep.& G.Plan 7-15-67 Detail Plans 5-15-68 Construction 10-15-70
Grand River	477	Grand R.	No public sewers.	-	New treat. facils - secondary.	Detail Plans 12-15-67 Construction 12-15-69
Orwell	830	Grand R.	No public sewers.	-	New treat. facils - secondary.	Detail Plans 3-15-67 Construction 11-15-68
Sewer Districts						
Lake County						
Concord S.D. Little Mtn Park Subdiv.		Kellogg Creek	S - Sec.+D 400 PE	'62,'65	None	
Leroy S.D. Sunshine Acres Subdiv.		Trib.of Big Creek	S - Sec.+D 250 PE	1963	None	
Willoughby-Mentor S.D. Beaver Creek Colony		Kellogg Creek	S - Sec.+D 200 PE	1963	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
GRAND RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Trumbull County						
Warren Champion S.D. Subdistrict 1-A Durst Allotment		Trib.of Center Crk	S - Sec.+D 400 PE	1961	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
HURON RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Huron	6,462	Huron R.	S & C (2 Plts) Int. + D 6,400 PE 2,100 PE	1964 '31,'64	Improvements - secondary treat.	Rep.& G.Plan 6-15-67 Detail Plans 6-15-68 Construction 11-15-70
Norwalk	14,194	Rattlesnake Creek	S & C Sec. + D 26,000 PE	'32,'64	Improvements - addtnl second.treat.	Construction 12-15-68
Villages						
Milan	1,563	Trib.of Huron R.	S - Pr. 600 PE	'41,'62	New treat. facils - secondary.	Bids 3-22-67
Monroeville	1,413	W.Branch	C - Pr.+D 1,700 PE	1959	Improvements - secondary treat.	Rep.& G.Plan 6-15-67 Detail Plans 6-15-68 Construction 12-15-69
Plymouth	1,953	Huron R.	C - Sec. 2,400 PE	1966	None	Construct.complete 1966

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Defiance	16,058	Maumee R.	S & C-Int.+D 23,000 PE	1957	Improvements - secondary treat.	Detail Plans 9-15-67 Construction 8-15-69
Delphos	7,404	Jennings Creek	C - Sec.+D 7,500 PE	'31,'55	Improvements - addtnl treat. facils.	Rep.& G.Plan 3-15-68 Detail Plans 3-15-69 Construction 9-15-70
Findlay	34,061	Blanchard River	S & C - Sec. 30,000 PE	'31,'54	Improvements - (incl.disinfect.)	Rep.& G.Plan approved Detail Plans 7-15-67 Construction 6-15-69
Perrysburg	6,553	Grassy Crk	C-Int.+Prechl.	1959	Improvements - secondary treat. & disinfect.	Rep.& G.Plan 6-15-67 Detail Plans 6-30-68 Construction 12-31-69
St. Marys	8,275	St.Marys River	S - Sec. 22,900 PE	1949	Improvements - (incl.disinfect.)	Detail Plans 6-15-67 Construction 6-15-69
Toledo	363,297	Maumee R.	S & C - Sec.+D 420,000 PE	'31,'59	Improvements - Sludge Hand.Facils - Treat.Facils -	Under Constr. 2/67 Rep.& G.Plan 7-15-67 Detail Plans 8-15-68 Construction 2/72
Van Wert	11,684	Trib's to Auglaize R.	S & C - Sec.+D 24,200 PE (BOD) 12,450 PE (S.S.)	'35,'36	Improvements - addtnl treat.facils.	Rep.& G.Plan 5-15-67 Detail Plans 8-15-68 Construction 12-15-69

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Villages						
Antwerp	1,614	Maumee R.	S & C No Treat.	-	New facils - incl.second.treat.	Rep.& G.Plan 6-15-67 Detail Plans 6-15-68 Construction 12-15-69
Columbus Grove	2,150	Trib.of Auglaize R.	S - Sec.+D 5,000 PE	1937	Improvements - addtnl treat.facils.	Now under construction. Construction 12-15-67
ridersville	1,210	Trib's to Auglaize R.	S - Sec. 2,000 PE	1966	None	Treat.facils completed 1966.
Elida	1,412	Ottawa R.	C - Sec. 3,000 PE	-	Complete new facils incl.second.treat.	Under construction - In operation 7/67.
Forest	1,370	Trib.of Blanchard R.	S & C	-	Complete new facils incl.second.treat.	Under construction - In operation 6/67.
Hamler	648	Turkeyfoot Creek	No public sewers.	-	New facils incl. secondary treat.	Detail Plans 5-15-68 Construction 12-15-69
Haskins	542	Haskins Creek	S - Pr. 200 PE	1939	Improvements - secondary treat.	Rep.& G.Plan 5-15-67 Detail Plans 7-15-68 Construction 12-15-69
Holgate	1,482	Trib.of Turkeyfoot Creek	No public sewers.	-	New facils incl. secondary treat.	Detail Plans 3-15-67 Construction 5-30-68
Liberty Center	924	Dry Crk	No public sewers.	-	New facils incl. secondary treat.	Rep.& G.Plan 9-15-67 Detail Plans 7-15-68 Construction 12-15-69

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Villages - contd.						
Montpelier	4,259	St.Joseph River	C - Prim. 5,150 PE	1958	Improvements - secondary treat.	Detail Plans 2-15-68 Construction 12-15-69
Northwood	3,843	Grassy Crk	No public sewers.	-	Negot.agreements with Toledo and Wood County for sewer connect.to city sewer system.	Report by 9-15-67 - Now in County Sewer Dist.
Ohio City	856	Trib's to Auglaize R.	No public sewers.	-	New facils incl. secondary treat.	Detail Plans 8-1-67 Construction 12-15-68
Ottawa	3,475	Blanchard River	C - Sec.+D 5,800 PE	1955	Improvements - addtnl capacity.	Rep.& G.Plan 7-15-67
Pandora	803	Trib.of Blanchard R.	No public sewers.	-	New facils incl. secondary treat.	Detail Plans - approved Construction 1-15-69
Payne	1,324	Trib.of Auglaize R.	C - Sec. 2,700 PE	-	New facils incl. secondary treat.	Under constr. early 1967 In operation early 1968
Rockford	1,172	St.Marys River	C - Prim. 1,240 PE	1959	Improvements - secondary treat.	Rep.& G.Plan 9-15-67 Detail Plans 4-15-68 Construction 8-15-69
Sherwood	649	Trib.of Sulphur Creek	No public sewers.	-	New facils incl. secondary treat.	Rep.& G.Plan 8-15-67 Detail Plans 5-15-68 Construction 9-15-69

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sev.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Villages - contd.						
Stryker	1,281	Trib.of Tiffin R.	C - Sec. 1,600 PE	1965	None	Treat.facils completed 1965.
Waterville	2,175	Maumee R.	C - Sec. 1,500 PE	1958	Improvements to treatment facils.	Rep.& G.Plan 7-15-67 Detail Plans 7-15-68 Construction 12-15-69
West Leipsic	340	Trib's to Beaver Cr.	No public sewers.	-	Financial problem - to make tributary to Leipsic.	
Weston	1,120	Tontogany Creek	C - Sec. 1,500 PE	-	Constr.of facils pending.	12/66 Bids over estimate; financial problem.
West Unity	1,550	Trib.of Tiffin R.	No public sewers.	-	New facils incl. secondary treat.	Detail Plans 6-15-67 Construction 12-15-69

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
OTTAWA RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
City						
Sylvania	7,650	Tenmile Crk	S - Sec.+D 3,000 PE	1957	Flow in excess of plant capac.to be discharged to Toledo sewer syst.	Construction complete by 6/67
Sewer Districts						
Lucas County						
Metropolitan S.D. Holland Subdist.		Trib.of Maumee R.	No public sewers.	-	New facils incl. secondary treat.	Rep.& G.Plan 3-15-67 Detail Plans 6-1-67 Construction 1-15-69
Metropolitan S.D. Sylvan Woods Subdiv. (Sewer #459)		Trib.to Tenmile Creek	S - Sec.+D 600 PE	1966	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
PORTAGE RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
City						
Port Clinton	7,352	Portage R.	S & C-Int.+D 15,000 PE	1956	Improvements - secondary treat.	Detail Plans 6-15-67 Construction 4-15-69
Villages						
Bloomdale	703	S.Branch Portage R.	No public sewers.	-	New facils incl. secondary treat.	Detail Plans 2-15-68 Construction 12-15-69
Elmore	1,360	Portage R.	Misused storm drains.	-	New facils incl. secondary treat.	Detail Plans 12-15-67 Construction 12-15-69
McComb	1,269	N.Branch Portage R.	S & C-Pr.+D 1,000 PE	1937	Improvements - secondary treat.	Detail Plans - approved Construction 12-15-68
Oak Harbor	3,128	Portage R.	S - Pr.+D 4,000 PE	1958	Improvements - secondary treat.	Rep.& G.Plan 8-15-67 Detail Plans 8-15-68 Construction 12-15-69
Pemberville	1,278	Portage R.	Misused storm drains.	-	New facils incl. secondary treat.	Rep.& G.Plan 6-15-67 Detail Plans 12-15-68 Construction 12-15-69
Woodville	1,878	Portage R.	Misused storm drains.	-	New facils incl. secondary treat.	Rep.& G.Plan 8-15-67 Detail Plans 8-15-68 Construction 12-15-69
Other Entity						
Camp Perry		Lacarpe Creek	S - Sec.+D 15,000 PE	1942	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
ROCKY RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Berea	19,643	E.Branch Rocky R.	S - Sec.+D 20,000 PE	'36,'51 & '65	Improvements - addtnl treat.facils.	Under construct. 1967 Construction 6-1-69
Broadview Heights	8,588	Trib.of Rocky R.	No public sewers.	-	New facils incl. secondary treat.	Detail plans 1-1-68 Construction 12-31-70
Lakewood	70,209	Rocky R.	S-C Sec.+D 130,000 PE	1965	None	Completed new plant 1965
Middleburgh Hts.	9,911	Abram Crk	S - Sec. 2,000 PE	1950	New facils incl. secondary treat.	Bids 4-9-67 Under construct. 5/6 Construction 12/68
					(Same as Cuyahoga Co.-Middleburgh Hts. S.D.)	
North Rovalton	11,101	Baldwin Crk E.Branch Rocky R.	S-(2 Plts) Sec.+D Total 11,400 PE	1966	-	(Detail Plans for Sew.Dist."C" to be revised.)
Strongsville	11,502	E & W Branches Rocky R.	S-(3 Plts) Sec.+D Total 7,347 PE	1966	-	Construction completed in 1966.
Village						
Olmsted Falls	2,284	Plum Crk W.Branch Rocky R.	Misused storm drains.	-	New facils incl. secondary treat.	To advertise for bids 5/67

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
ROCKY RIVER BASIN - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Sewer Districts						
Cuyahoga County						
Middleburgh Hts. S.D.		Abram Crk	S-Sec. 2,000 PE	-	Same as City of Middleburgh Hts. above.	
Lorain County						
Sewer District #60 West River Subdiv.		W.Branch Rocky R.	S-Sec. 60 PE	1959	None	
Sewer District #60 West View Park Subdiv.		W.Branch Rocky R.	No public sewers.	-	Sewers & new treat. facils - secondary.	Rep.& G.Plan 3-1-67 Detail Plans 6-1-67 Construction 12/68
Medina County						
Sewer District #9 Hinckley Lake Estates		E.Branch Rocky R.	S-Sec.+D 100 PE	1961	None	
Sewer District #11 Village Homes Subdiv.		W.Branch Rocky R.	S-Sec.+D 123 PE	1966	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
SANDUSKY RIVER BASIN

Entity Pop.	1965 Stream	Receiving Treat.& Design	Type Sew.Syst.	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Fremont	20,058	Sandusky R.	C-Sec.+D 128,500 PE	1949-66	None	Completed construction 1966
Tiffin	22,475	Sandusky R.	C - Pr.+D 25,000 PE	1956	Improvements - secondary treat.	Under construct. 4-15-67 Construction 7-15-68
Villages						
Attica	1,012	Honey Crk	Misused storm drains.	-	New facils incl. secondary treat.	Rep.& G.Plan 6-15-67 Detail Plans 6-15-68 Conctruction 12-15-69
Bloomville	862	Honey Crk	Misused storm drains.	-	New facils incl. secondary treat.	Rep.& G.Plan 8-15-67 Detail Plans 6-15-68 Construction 12-15-69
Upper Sandusky	5,286	Sandusky R.	S-Sec.+D 7,000 PE	1956	Improvements - addtnl treat.facils.	Rep.& G.Plan 3-15-68 Detail Plans 3-15-69 Construction 9-15-70
Sewer Districts						
Sandusky County						
Sewer District #1		Muskellunge Creek	No treat.	-	Sewers & connection to Fremont sew.syst.	Detail Plans 1-15-68 Construction 1969
Seneca County						
Clinton Township		Gibson Creek	No treat.	-	Sewers & connection to Tiffin sew.syst.	Detail Plans 11-15-67 Construction 1968

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
VERMILION RIVER BASIN

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
City						
Vermilion	7,723	Vermilion River	S - 2 Plts Pr. + D 4,000 PE 1,500 PE	1921 1957	New facils incl. secondary treat.	Under construct. 3/67 Construction 3/69

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
TRIBUTARY TO LAKE ERIE

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Amherst	8,617	Beaver Crk	S - Sec. 10,000 PE	'27,'57	Improvements - addtnl treat.facils.	Rep.& G.Plan 12-15-67 Detail Plans 12-15-68 Construction 6-15-70
Bellevue	8,846	Big Ditch Pipe Crk	No public sewers.	-	New facils incl. secondary treat.	Under constr. early 1967 Construction 9-1-69
Conneaut	14,951	Conneaut Creek	S-Int.+D 17,000 PE	1957	Improvements - secondary treat.	Rep.& G.Plan 3-15-67 Detail Plans 1-15-68 Construction 10-15-69
Westlake	14,574	Porter Crk	No public sewers.	-	Connection to County Sew.Dist.System.	Depends on current litigation re financing (Cuyahoga County project).
Villages						
Green Springs	1,316	Trib's to Sand. Bay	S & C - Pr. 1,300 PE	1936	Improvements - secondary treat.	Detail Plans 7-15-67 Construction 12-15-68
Madison	1,435	Big Creek	S - Sec. 1,500 PE	1929		
			S - Sec. 2,000 PE	1967	Completely new facils- secondary treatment.	Construction 6/67
Walbridge	2,847	Cedar Crk	S-Pr.+D 1,000 PE	1941	Complete sewer connect. to Toledo sewer system.	Under construction. To complete connection 6-15-67

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
TRIBUTARY TO LAKE ERIE - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Sewer Districts						
Erie County						
Perkins-Margaretta S.D. Subdistrict B		Pipe Crk	No public sewers.	-	New treat.facils (secondary) or connection to City of Sandusky sew.syst.	Rep.& G.Plan early '67 Detail Plans 8-1-68 Cónstruction 12-15-69
Lake County						
Painesville S.D. #3 Villa Rio Subdiv.		Marsh Crk	S-Sec.+D 75 PE	1963	None	
Willoughby-Mentor S.D. French Hollow Estates #9		Trib.of Marsh Crk	S-Sec.+D 100 PE	1964	none	
Lucas County						
Metropolitan S.D. Fuller's Creekside Subdiv.		Shantee Creek	S-Sec.+D 1000 PE	1962	None	
Wood County						
Main Sewer Dist. #9 Sanitary S.D. #1 Indian Trails Estates		Cedar Crk	S-Sec.+D 260 PE	1963	None	

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
DIRECT TO LAKE ERIE

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities						
Ashtabula	25,036	L.Erie	S-Int.+D 55,000 PE	1955	Improvements - secondary treat.	Rep.& G.Plan 3-15-67 Detail Plans 6-15-68 Construction 10-30-70
Avon Lake	11,992	L.Erie	C-Int.+D 16,590 PE	1961	Improvements - secondary treat.	Rep.& G.Plan early '67 Detail Plans 2-15-68 Construction 1970
Cleveland	858,823 + 484,423 21 Trib.Munic's	L.Erie	S & C Easterly Sec. + D 1,230,000 PE	1938	Addtnl treat.facils.	See attached schedule - City of Cleveland.
		L.Erie	Westerly Prim. + D 360,000 PE	'22,'57	Addtnl treat.facils.	ditto
Euclid	66,742	L.Erie	S-Int.+D 100,000 PE	1960	Improvements - secondary treat.	Rep.& G.Plan 5-1-67 Detail Plans 6-1-68 Construction 6-30-70
Oregon	14,829	L.Erie	-	-	New facils incl. secondary treat.	Rep.& G.Plan approved Detail Plans 7-30-68 Construction 12-30-69
					(Part trib.to Toledo;remainder no pub.sewers.)	
Sandusky	33,841	L.Erie	S & C Pr.+D 49,300 PE	1959	Improvements - secondary treat.	Rep.& G.Plan early '67 Detail Plans 6-30-68 Construction 11-30-70

STATUS OF MUNICIPAL WASTE TREATMENT FACILITIES
DIRECT TO LAKE ERIE - Contd.

Entity	1965 Pop.	Receiving Stream	Type Sew.Syst. Treat.& Design	Date Built	Additional Requirements	Approved Schedule (Completion Dates)
Cities - contd.						
Willoughby[(a)]	34,525	L.Erie	S-Int.+D 33,800 PE	1961	Improvements - secondary treat.	Rep.& G.Plan 4-15-67 Detail Plans 7-15-68 Construction 7-15-70
Villages						
Geneva-on-the-Lake	706	L.Erie	S-Pr.+D 5,000 PE	1928	Improvements - secondary treat.	Rep.& G.Plan 6-15-67 Detail Plans 6-15-68 Construction 12-15-69
Harbor View	280	L.Erie	No public sewers.	-		To be tributary to Oregon's sew.syst. (See Oregon above.)
Sewer Districts						
Cuyahoga County						
Rocky River S.D. #6		L.Erie	S-Int.+D 160,000 PE	1962	Improvements - secondary treat.	Rep.& G.Plan early '67 Detail Plans 6-15-67 Construction 9-15-69
Erie County						
E.Erie Co.Sewer & Wat.Dist. Ruggles Beach-Mittiwanga		L.Erie	S-Pr.+D 1,300 PE	1921	Improvements - secondary treat.	Rep.& G.Plan 3-1-67 Detail Plans 8-1-68 Construction 12-15-69
Lake County						
Madison S.D. #1		L.Erie	S-Int.+D 9,000 PE	'24,'62	Improvements - secondary treat.	Rep.& G.Plan 1-1-68 Detail Plans 1-1-69 Construction 1-1-71
Willoughby-Mentor S.D.		L.Erie	S-Int.+D	1965	ditto	ditto

(a) - Eastlake - 27,525 pop. - trib.to Willoughby severage system.

SOUTHERLY PLANT
CITY OF CLEVELAND, OHIO

EXHIBIT A

CONTRACT	Completion Date Detail Plans	Period of Construction Start	Period of Construction Completion	Est. Total Cost Incl. Engr. etc @ 15%
New Secondary Treatment Facilities	Jan. 1967 *	Sept 1967	Dec. 1969	$5,756,000
Pre-Treatment Expansion	June 1968 **	Sept 1968	Dec. 1969	980,000
Service Bldg. Conversion	June 1968 **	Sept 1968	Dec. 1969	517,000
Post-Chlorination Facil	June 1968 **	Sept 1968	Dec. 1969	400,000
Primary Digester Gas Mixing	June 1968	Sept 1968	Dec. 1969	575,000
Roads and Lighting	June 1969	Sept 1968	Dec. 1969	345,000
				$8,573,000

* Design Authorized
** Design to be Authorized Jan. 1967

Based on projects receiving at least Federal Grant Aid

EASTERLY PLANT
CITY OF CLEVELAND, OHIO

EXHIBIT B

CONTRACT	Completion Date Detail Plans	Period of Construction Start	Completion	Est. Total Cost Incl. Engr. etc @ 15%
New Primary Settling tanks & Enlargements	June 1967 *	Sept 1967	Dec. 1969	$2,990,000
4 New Final Settling Tanks & Enlargements	June 1968 **	Sept 1968	Sept 1970	1,104,000
Aeration Tank Improv.	June 1968 **	Sept 1968	Sept 1970	1,966,000
New Grease & Scum Handling & Disposal Facilities	June 1967 *	Sept 1967	Dec. 1969	414,000
New Southerly Sludge . Pump Facilities	June 1967	Sept 1967	Dec. 1969	299,000
New Detritus Tanks & Comminutors	June 1968	Sept 1968	July 1970	1,035,000
Collinwood Interceptor & Overflow Revisions	June 1968	Sept 1968	July 1970	173,000
Miscel. Plant Improv.	June 1968	Sept 1968	July 1970	460,000
				$8,441,000

* Design Authorized
** Design to be Authorized Jan. 1967

Based on project receiving at least Federal Grant Aid.

WESTERLY PLANT
CITY OF CLEVELAND, OHIO

EXHIBIT C

CONTRACT	Completion Date Detail Plans	Period of Construction Start	Period of Construction Completion	Est. Total Cost Incl. Engr. etc. @ 15%
Item 1 Site Work	June 1967 *	Sept 1967	June 1968	$ 5,869,000
Item 2 Plant Work	June 1968 *	Sept 1968	Dec. 1970	8,651,000
Item 3 Lift Station	June 1969 *	Sept 1969	Dec. 1970	1,505,000
Item 4 Digester Facilities	June 1969 *	Sept 1969	Dec. 1970	728,000
Item 5 Sludge Disposal Facilities	June 1969 *	Sept 1969	Sept 1971	1,775,000
Item 6 Miscellaneous	June 1969 *	Sept 1969	Dec. 1971	202,000
				$18,731,000

* Design to be Authorized Feb. 1967

Based on projects receiving at least Federal Grant Aid

EXHIBIT D

WATER POLLUTION CONTROL BOARD

DATA RE CURRENT PROGRAM OF IMPROVEMENTS

DATE: January 5, 1967

NAME OF PERMITTEE: City of Cleveland

ADDRESS: 601 Lakeside Ave.
Cleveland, Ohio - 44114

SUBURBAN TRUNK SEWERS PROJECT

Name of Consulting Engineer: Consulting Engineer or Engineers will be retained after legislation authorizing employment of consulting engineers is passed by the Cleveland City Council. The original legislation that was prepared to go to City Council the early part of October 1966 was withheld so that the City could explore more carefully and fully the possibility of city forces doing some of the engineering work. This legislation will now go to the City Council for their consideration on January 9, 1967.

Completion Date of General Plan: Estimated to be Dec. 31, 1967.

G. H. Eagle

Completion Date of Detail Plans: Estimated to be Dec. 31, 1968.

Financing Program: The total cost of the Suburban Trunk Sewer Project has been estimated at $20,500,000.

The financing of Engineering for General and Detail Plans including specifications, has already been provided for in the new three year Agreement on Sewerage Service Charges effective July 1, 1966 between Cleveland and the suburbs that it services.

The Cleveland Master Plan for water pollution abatement and control will study the financing of construction which is planned to start after July 1, 1969. However this will be contingent on an agreement being reached between Cleveland and the suburbs as to the financing of these trunk sewers which basically will serve to bring suburban sewage direct to the Cleveland plants.

Date of Start of Construction: After July 1, 1969

Date of Completion of Construction: Impossible to estimate at this time.

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
ASHTABULA RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Cabot Titania Corporation Titanium Dioxide Plant	Chemical Suspended solids	Settling basins	Additional facilities for reduction of solids	Completed 9-1-66
Cabot Titania Corporation Titanium Tetrachloride Unit	Chemical Suspended solids	Lagoons	Additional facilities for reduction of solids	Plans 1-67 Construction 6-1-67
Detrex Chemical Industries, Inc. Chlorinated Solvents Division	Chemical Hydrocarbons	Lagoons settling Neutraliz.	In-plant control of hydrocarbons	Completed 2-1-67
Diamond Alkali Company Semi-Works	Chemical, Acids Suspended solids	Neutraliz. Chem. treat. settling incineration	Additional facilities and control for solids reduction	Completed 9-1-66
The General Tire & Rubber Company, Chemical Division	Chemical solids	Chemical treatment settling	Additional facilities and control for solids	Completed 12-1-66
Olin Mathieson Chemical Corp. TDI Facility	Chemical solids	Lagoons	In-plant improvements for neutralization and solids	Completed 12-66
Reactive Metals, Incorporated Metals Reduction Plant	Chemical, Acids Solids	Neutraliz. settling	Additional facilities for solids removal	General Plans 9-1-66 Detail Plan 6-1-67
Reactive Metals, Incorporated Sodium & Chlorine Plant	Chemical, Susp. Dissolved solids	Settling ponds	Additional in-plant controls for solids reduction	Construction 10-1-67 Completed 12-66

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
BLACK RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Locke Manufacturing Company	Steel-Acid Iron	Neutraliz.	Discharge to municipal system. Exempt	Completed 7-1-66
Republic Steel Corporation Steel and Tubes Division	Steel-Acid Iron	Controlled discharge after settling	Reduction of acids	Plans 6-1-68 Construction 12-31-69
Ternstedt Division General Motors Corporation	Metal Finish.	Cyanide oxidation chrome reduction settling	Expanded treatment facilities under construction	Construction 11-15-67
U. S. Steel Corporation Tubular Operations	Steel-Blast Furn. Susp. solids	Clarification	Additional reduction of solids	Study report 6-1-67 Construction 12-31-69

CHAGRIN RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Chase Bag Company	Paper Mill	Filtration for removal of solids	Secondary treatment facilities	Plans 6-1-68 Construction 12-31-69

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
The Bailey Wall Paper Company	Organic	None	Company plans to move to new location on public sewer	7-1-67
The Cuyahoga Meat Company	Meat Packing	Septic tank	New complete treatment facilities	Plans 4-1-67 Complete construction 6-1-68
Diamond Crystal Salt Company	Chemical	Settling	Additional reduction of chlorides	Plans 6-1-67 Construction 1-1-68
E. I. duPont deNemours and Company, Incorporated Ind. and Biochemicals Dept.	Chemical, Acids, Metals	Zinc recovery Acid neutraliz.	Improvements to treat. and disposal facilities	Completed 8-1-66
Ferro Chemical Division of Ferro Corporation	Chemical Suspended solids	Clarification	Improvements to treat. facilities	Plans 10-1-66 Construction 4-1-67
Firestone Tire & Rubber Company Akron Plant	Solid, oils and organics	Some waste trib. to mun. sewers	Reduction of all critical constituents	Plans 1-1-68 Construction 1-1-69
General Tire & Rubber Company Akron Plant	Solid, oils and organics	Some waste trib. to mun. sewers	Reduction of all critical constituents	Plans 1-1-68 Construction 1-1-69
B. F. Goodrich Rubber Company Akron Plant	Solid, oils and organics	Some waste trib. to mun. sewers	Reduction of all critical constituents	Plans 1-1-68 Construction 1-1-69

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN - Contd.

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Goodyear Aerospace Corporation	Metal Finish.	Control facilities	Facilities for pretreatment & discharge to municipal sewers	Plans 6-1-67 Construction 6-1-68
Goodyear Tire & Rubber Company Akron Plant	Solid, oils and organics	Some waste trib. to mun. sewers	Reduction of all critical constituents	Plans 1-1-68 Construction 1-1-69
Harshaw Chemical Company	Metal Salts	In-plant control	Additional in-plant control of metals & fluorides. Settleable solids removal	Plans 7-1-67 Construction 12-31-68
Jones & Laughlin Steel Corp.	Steel-Acid Iron	Controlled discharge	Removal or treatment of waste pickling acids	Plans 6-1-67 Construction 8-1-67
Jones & Laughlin Steel, Corp.	Steel-Blast Furn. Suspended solids	Clarification	Improved reduction of solids	Plans 6-1-68 Construction 12-31-69
Jones & Laughlin Steel, Corp.	Steel-Mill Scale Suspended solids	Clarification	Improved reduction of solids	Plans 6-1-68 Construction 12-31-69
Lerkis Asphalt Company, Inc.	Asphalt (Unclassified)	Lagoon	Improved reduction of suspended solids	Construction 7-1-66
Master Anodizers & Platers, Inc.	Metal Finish.	Chrome reduction	Improved reduction of metals and solids	Plans approved 1-67 Construction 7-1-67

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN - Contd.

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Republic Steel Corporation				
Bolt & Nut Division	Steel-Acid Iron	Controlled discharge	Plating wastes to municipal sewers Removal or treatment of waste pickling liquors	Construction 12-31-68 Plans 6-1-68 Construction 12-31-69
Cleveland District	Steel-Acid Iron	Controlled discharge	Removal or treatment of waste pickling liquors	Plans 6-1-68 Construction 12-31-69
Cleveland District	Steel-Blast Furn. Suspended solids	Clarification	Improved reduction of suspended solids	Plans 6-1-68 Construction 12-31-69
Cleveland District	Steel Mill Scale Suspended solids	Scale pits	Improved reduction of suspended solids	Plans 6-1-68 Construction 12-31-69
Sonoco Products Company Ohio Division	Paper Mill	Aeration and clarification	Connect to County Sewer	Construction 1-30-69
The Standard Oil Company No. 1 Refinery	Oil Refinery	Oil separation and recovery	Refinery operations discontinued. Wastes from asphalt processing to be made tributary to Cleveland municipal sewers.	Construction 6-1-67
Sherwin Williams Linseed Oil Mill	Oily sludges	Filtration	Discharge of filtrate to Cleveland mun. sewers	
U. S. Steel Corporation				
Central Furnaces	Steel-Blast Furn. Suspended solids	Clarification	Additional reduction of suspended solids	Plans 6-1-68 Construction 12-31-69
Central Furnaces	Blast Furnace (Sewage)	None	To municipal sewers. Exempt	Construction 12-8-66

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
CUYAHOGA RIVER BASIN - Contd.

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Cuyahoga Works	Steel-Acid Iron	Controlled discharge	Neutralization of pickling acids and removal of solids and metals	General plan 11-66 Detail plans 3-67 Construction 12-68
Cuyahoga Works	Steel-Mill Scale Suspended solids	Scale pits	Additional reduction of suspended solids and oil	General plans 11-66 Detail plans 3-67 Construction 12-68
Weather-Tite Company	Metal Finish	Aluminum removal	Neutralization and reduction of solids	Detail plans 10-66 Construction 7-67

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
GRAND RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Diamond Alkali Company	Chemical, Susp. & dissolved solids, chromium	Settling, neutralization reduct. - controlled discharge	Reduction of chrome wastes	Plans 3-1-67 Construction 10-1-67
			Additional facilities for neutralization and solids reduction	Plans 6-1-67 Construction 6-1-68
The Metal Craft Company	Metal Finish.	Controlled discharge	Neutralization and reduction of solids	Plans 4-1-67 Construction 6-1-67
A. E. Staley Manufacturing Co.	Chemical Soy Bean Prod.	Recovery facils. and lagoon	Treatment by municipality when facilities available	12-68
UNIROYAL United States Rubber Co. Chemical Division Plant Area #4	Chemical	Chem. treat. and lagoon	Facilities being rebuilt following explosion. Evaluation of additional needs to follow.	
United States Rubber Company Chemical Division Plant Area #1	Chemical, Susp. & Dissolved solids	Screening, settling lagoons	Additional facilities for solids, oxygen demanding material and solids	General Plans 1-1-68 Detail plans 10-1-68 Construction 12-1-69

HURON RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (CompletionDates)
The Baltimore & Ohio Railroad Co.	Railroad Oil	Oil Separators	Additional facilities for removal of oil	Plans 7-1-67 Construction 7-1-68
Clevite Corporation Harris Division, Milan Plant	Metal Finish.	Settling (lagoon)	Additional facilities for neutralization and reduction of metals and solids	Plans 7-1-67 Construction 7-1-68

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Campbell Soup Company	Organic Soup Cannery Tomato Cannery	Trickling filters for soup production, land spray for tomato oper's	Additional reduction of solids and oxygen demand	Detail plans 1-68 Construction 7-1-69
Central Foundry Division GMC, Defiance Plant	Steel Foundry	Settling lagoons	Additional solids reduction	Construction 7-1-67
Clevite Corporation Harris Division Napoleon Plant	Metal Finishing	Settling and filtration	Additional facilities neutralization, reduction of metals and solids	Plans 7-1-67 Construction 7-1-68
Edgerton Metal Products, Inc.	Inorganic Metal Finish.	Cyanide oxidation	Treatment of chrome wastes, neutralization, reduction of solids	Construction 7-1-67
Elite Plating Division Dynavest Corporation	Metal Finish.	None	Reduction of metals and cyanide, neutralization	Plans 7-1-67 Construction 7-1-68
Hayes Industries, Inc. Decorative Division	Inorganic, Metal plating	Acid neutralis. settling	Additional facilities for improved reduction of solids and neutralization	Complete 7-1-66
Interlake Steel Corporation	Steel Blast Furnace	Clarification	Additional reduction of solids	Plans 5-1-68 Construction 8-1-69

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN - Contd.

Entity	Type of Wastes	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Johns-Manville Fiber Glass, Incorporated, Plant #3	Phenolic	Reuse system Chemical Treat.	Facilities for closed recycle system under construction	Completion 8-1-67
Johns-Manville Fiber Glass, Incorporated, Waterville Plt.	Organic Phenolic	Swale area, soil infilt.	Additional facilities for complete treatment	Completed 12-1-66
Libby, McNeill & Libby	Organic Tomato process.	Land spray disposal	Additional facilities for treatment of peak loads	Plans 6-1-67 Construction 8-1-67
National Refining Company Division of Ashland Oil & Refining Company	Oil Refinery	API separator	Additional facilities for oil, solids and oxygen demand reduction under construction	Plans 9-1-66 Construction 6-1-67
Pepsi-Cola Bottling Company	Food Process. (Misc.)	Complete treatment	Additional facilities for reduction of oxygen demand	Plans 3-1-67 Construction 1-1-68
Republic Creosoting Company, Division of Reilly Tar & Chemical Corporation	Phenolic Wood Preserving	Separator and straw filters	Reduction of phenolics and oil	Plans 1-1-68 Construction 1-1-69
Rusco Division Rusco Industries, Incorporated	Inorganic Metal Finish.	Acid neutraliz. settling	Neutralization and solids reduction	Plans 8-1-67 Construction 8-1-68

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
MAUMEE RIVER BASIN - Contd.

Entity	Type of Wastes	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
S-K Wayne Tool Company	Inorganic Metal Finish.	In-plant control monitored disch.	Neutralization and metals reduction	Plans 3-1-67 Construction 1-1-68
Vistron Corporation (formerly Sohio Chem. Co.)	Chemical	Lagoon	Additional reduction of nitrogen compounds	In-plant controls 1-1-68 Research studies underway
Sohio Chemical Company	Organics Petro chemicals	Chemical, lagoon, incineration & biological treatment	Additional reduction of nitrogen compounds and oxygen demand	Plans 1-1-68 Construction 1-1-69
The Standard Oil Company	Oil Refinery	API separator, air flotation facils	Aerated lagoon for biological treatment	Completed 2-1-67
Walter & Sons, Incorporated	Organic	Septic tank, sand filter	Process change Evaluate existing facil. for present operations	Evaluation 8-1-67
The Weatherhead Company Ohio Division	Inorganic Metal Plating	Chemical, Cyanide oxid., sec.treat. of sewage	Additional reduction of metals and solids	Plans 6-1-67 Construction 9-1-68

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
OTTAWA RIVER (TENMILE CRK) BASIN

Entity	Type of Wastes	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Dana Corporation Toledo Division	Oil Treatment (Unclass.)	Chemical treatment & reuse	Improvements in facilities and operation	Completed 12-1-66

PORTAGE RIVER BASIN

Entity	Type of Wastes	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
The Seneca Wire and Manufacturing Company	Steel-Acid Iron	Neutraliz., settling controlled discharge	Additional facilities for metals and solids	Plans 1-1-68 Construction 1-1-69
Swift & Company	Soybean Mill Chemical	Grease separation	Facilities for reduction of oil, color and oxygen demand. Anticipate connection to mun. sewers	Construction 6-1-67

ROCKY RIVER BASIN

Entity	Type of Wastes	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Astoria Plating Corporation	Metal Finish.	Cyanide oxiation, chrome reduction	Additional facilities for reduction of metals and cyanide	Plans 4-1-67 Construction 1-1-68

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO
SANDUSKY RIVER BASIN

Entity	Type of Wastes	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Northern Ohio Sugar Company	Beet Sugar	Holding lagoons controlled discharge	Additional reduction of oxygen demand	Plans 12-31-68 Construction 12-31-69
The Pioneer Rubber Company Plant No. 2	Rubber-Alcohol	None	Facilities for reduction of oxygen demand	Anticipate connection to proposed municipal sewerage

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES TRIBUTARY TO LAKE ERIE

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Pechtel-McLaughlin, Incorporated	Metal Finishing	Cyanide oxidation	Facilities for neutralization, chrome and solids reduction	Plans 2-1-67 Construction 2-1-68
Doehler-Jarvis Division National Lead Company Toledo Plant #2	Metal Finishing	In-plant controls & recovery	Additional facilities for reduction of metals, solids and cyanide	Plans 6-1-67 Construction 6-1-68
Central Soya Company	Oils and organics	Lagoons	Additional facilities for reduction of oil	Plans 6-1-67 Construction 6-1-68
Cleveland Metal Cleaning Company	Acids, oil and solids	None	Facilities for neutraliz. and oil and solids removal	Plans 8-1-67 Construction 7-1-68
Donn Products, Incorporated	Metal Finishing	Neutraliz. Lagoon	Additional facilities for treatment of chromium waste	Plans 7-1-67 Construction 1-1-68
General Electric Company Bellevue Lamp Plant #242	Sewage only	Septic tank	To be made tributary to municipal system	Construction 9-1-69
Hirzel Canning Company	Tomato-Beet Cannery	Land spray	Additional facilities for more positive control of wastes	Construction 8-1-67
The Lake Erie Canning Company	Cannery Tomato, Kraut, Cherry	Lagoon	Additional facilities for reduction of oxygen demand	Plans 3-1-67 Construction 8-1-67

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES TRIBUTARY TO LAKE ERIE
Contd.

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
Libbey-Owens-Ford Glass Co. East Toledo Plant	Glass Mfg.	Lagoons	Additional facilities for solids reduction	Plans 10-1-67 Construction 1-1-69
Natl. Aeron. & Space Admin. Plum Brook Station (Research Center)	Sewage only	Primary	Secondary treatment	Plans ? Construction 12-1-67
Norfolk & Western Railroad Bellevue Yards	Oils	None	Facilities for removal of oils and solids	Plans 6-1-67 Construction 6-1-68
The Standard Oil Company Toledo Refinery	Oils	Oil separators lagoons	Additional facilities for reduction of oil, solids, phenols and oxygen demand	Plans 1-1-68 Construction 12-31-69
Toledo Scale, Division of Toledo Scale Corporation	Metal Finishing	Settling and controlled discharge	Facilities for reduction of metals, solids and oil	Plans 7-1-67 Construction 7-1-68
True Temper Corporation	Metal Finishing	Chrome reduction, cyanide oxidation	Additional facilities for reduction of solids and oil	Plans 5-66 Construction 6-1-67

STATUS OF INDUSTRIAL WASTE TREATMENT FACILITIES
DIRECT TO LAKE ERIE

Entity	Type of Waste	Treatment Provided	Additional Requirements	Approved Schedule (Completion Dates)
The Cleveland Electric Illum. Co.				
Ashtabula Plant	Suspended solids	Lagoons	Additional facilities for reduction of solids	Plans 12-67 Construction 12-68
Avon Plant	Suspended solids	Lagoons	Additional facilities for reduction of solids	Plans 7-1-67 Construction 7-1-68
Lakeshore Plant	Suspended solids	Lagoons	Additional facilities for reduction of solids	Plans 12-67 Construction 10-68
Eastlake Generating Station	Suspended solids	Lagoons	Additional facilities for reduction of solids	Plans 7-67 Construction 4-68
IRC Fibers Division Midland-Ross Corporation	Suspended solids Zinc, organics	Lagoons	Facilities for neutraliz. and reduction of zinc and solids	Plans 2-1-67 Construction 1-1-69
The Lubrizol Corporation	Chemical	Chemical & Biological Oil Removal	Additional facilities for reduction of oxygen demand	Plans 4-1-67 Construction 12-1-67
TRW, Incorporated	Metal Finishing	Chemical & settling tanks	Additional facilities for neutralization and reduction of metals & solids	Plans 12-1-66 Construction 1-1-69
United States Gypsum Company	Paper Mill	Clarification & in-plt. reuse	Facilities for complete treatment	Plans 9-1-68 Construction 12-31-69
United States Rubber Company	Chemical	Wastes treated in Erie Ordinance complete facilities		Connected 7-15-66

★ U.S. GOVERNMENT PRINTING OFFICE : 1967 O—268-162 (VOL. 1)